

M E M O I R S

OF THE

ROYAL ACADEMY

O F

S U R G E R Y,

At P A R I S:

CONTAINING,

A great Variety of CASES,

In the chief Branches of the ART.

Many of them

Very surprising and uncommon.

Translated from the ORIGINAL dedicated to the
FRENCH King.

VOLUME I.

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P R E F A C E.

TH E Sciences continue long in a state of infancy, their progress is a work of much time, and even the longest and most successful labours leave a void, which cannot easily be filled up: In short, perfection seems to retire in proportion to the efforts made to attain it.

Surgery is one of those sciences which has been cultivated with most care: but though necessity, the learning, industry, and united labours of various centuries, have made such discoveries as greatly promoted its improvement; yet there are none but persons of superficial understanding, who can imagine that the boundaries of our Knowledge are those of Surgery itself. The variety and multiplicity of our disorders, their causes which are so latent, and the helps we want, present us with but too large and unknown a field, where we are incessantly reduced to strike out new paths for ourselves.

The question then is, What method Surgeons ought to take to bring their art to perfection? Should they wait the progress of that experience which is acquired by practice alone, which so often renders the Surgeon intolerably vain, and imposes on the vulgar? No. If the knowledge to be gain'd by such experience could have brought Surgery to perfection, the art would have been perfected some centuries ago.

But in order to perfect Surgery, there are other things necessary to be known, full as essential, and more difficult to be acquired, which must concur with practical observations. And the knowledge of these particulars, to which too many Surgeons are
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strangers, is the result of physical experiments. Thus it appears, that the truths which enrich our art, spring from two sources, Observation and experimental Philosophy; the necessity of both which may be easily demonstrated.

Nature discloses herself but in an obscure manner; for which reason we ought to examine her steps strictly, follow her wherever she goes, and observe her operations. But in making observations, the mind is no more than a bare spectator, and only sees, as it were, the outside of objects: we must have recourse, therefore, to physical Experiments, in order to penetrate into the sensible principles of nature; or, in other words, we must be before hand with her, examine, and force her to discover herself.

Observation, and physical Experiments, which are the foundation of Surgery, have then very different objects in view; for the former comprehends the sensible qualities of bodies, the course of diseases, their symptoms, and the effects of the Surgeon's medicines and applications: whereas physical Experiments discover the structure and functions of the parts, the composition of mixt bodies, the qualities of the circulating fluids, the nature of aliments, and the action of medicines.

But these necessary helps of Observation and physical Experiments, do not separately lead us to those hidden truths which improve our art; for Observations strengthen Experiments, and these again confirm Observations; so that they mutually support each other. Thus, if it is necessary to observe exactly the subjects which we examine by physical Experiments, we must afterwards compare these Experiments with Observations, and consider them together. Hence it appears that Observation and Experiments are, as it were, the two lights which ought to re-unite, to dissipate the obscurity of our art.

But Observation may be either imperfect or fallacious;

cious; it has equally given birth to error and truth, and opinions directly opposite have frequently had the sanction of an equal number of Observations to support them. Before experimental Philosophy began to be cultivated, Physic and Surgery were almost entirely founded on practical Observations; and these could not produce an uniformity of sentiments amongst practitioners, because they adhered the more stiffly to their different opinions, as they thought nature declared herself more strongly in their respective favour. Observations, alone, are therefore no more decisive, than those ambiguous oracles, or equivocal laws, which either interest or prejudice interpreted just as they pleased.

The Antients were of opinion, that the choice of particular parts of bleeding was not an indifferent matter. According to their notions, the opening of certain veins and arteries in those parts which lay near each other, and, what is still more surprising, even in the same parts, was dignified with the title of *specific remedies* for very different diseases. These absurd prejudices were notwithstanding founded upon Observations; and a course of two thousand years was not sufficient to make the closest observers change their opinions in this respect; so that the diseased gave up their blood and their lives to the caprice of Physicians and Surgeons, upon the credit of the most equivocal observations.

Such are the Observations which have infected theory with false opinions. Thus the blackish humor, which generally runs from cancerous tumors, induced the Antients to believe, that they were caused by an atrabiliarious juice: but physical, anatomical, and chymical experiments have taught us, that these tumors are only formed by the stagnation of a lymphatic humour; and at the same time informed us, that this humour is in certain cases subject to a most fatal putrefaction.

Observation likewise introduced into Surgery still grosser errors. Wounds are often succeeded by obstructions, which all the practitioners accounted *defluxions*, and asserted that they proceeded from the weak texture of the parts; and, agreeably to this notion, they applied astringents to the fluids which stagnated about a wound, and such remedies as would strengthen the weaken'd fibres: but such applications added new force to the causes they intended to remove, and those obstructions, which might have been easily remedied, became mortal, in consequence of the operation of these medicines. And thus, all that accrued to the patients, from the most universally received observations, was an increase of bad accidents; which was not sufficient to rectify the Surgeon's prejudices, but these fallacious Observations always prevailed, even in spite of the ill success which shewed how bad they were.

Books abounded with the like absurdities, which Observation consecrated as truths authorized by nature, and the consent of practitioners; and some ages passed, before anatomical enquiries, and physical discoveries could dissipate these errors. Without these, fresh Observations might perhaps have led practitioners into new mistakes; at least, the ablest Surgeons could not have got rid of most of the prejudices which had so long enslaved the ancient masters of the art: whence we may infer, that Observation can only be corrected by physical Inquiries.

But if Observations are to be corrected by physical Experiments, these latter, in their turn, require the assistance of the former; and the reciprocal testimony and agreement of both constitutes the characteristic of truth. Experiments may mislead, as well as Observation: we may apply the consequences we draw from them, to things which evince their falsity: whence it appears, that Experiments must be tried by the testimony of nature, in order to avoid those errors

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rors to which they might otherwise give occasion.

When the immortal *Harvey* had convinced the Physicians of his time, that the circulation of the blood was the principle of life, from a fondness, they proceeded to a contempt of all the opinions of the antients. They would no longer own, that there were remedies appropriated to particular parts, but asserted, that the circulation of the blood carries them through the whole body, and that they act equally on all its parts: but accurate observations at last forced the most obstinate abettors of this doctrine to return to the opinions of the antients, as to the effects of remedies. The physical Experiments that discovered the circulation of the blood, did therefore produce erroneous opinions, which only Observation could destroy.

Again, Observation not only rectifies physical Experiments, but also suggests new ones, which, but for those, perhaps would not have been tried. Thus, for instance, Surgeons learn'd from Observation, that a ligature stops the course of the blood in the veins, and that, therefore, it is necessary afterwards to slacken it, in order to facilitate the discharge of the blood through the orifice. The cause of this phænomenon remained long a secret, but at last curiosity was awakened, and the experiments it suggested discovered the mystery of the circulation, which in consequence illustrated the very observation which made that discovery. Thus Observation leads to Experiment, and Experiment illustrates Observation. Those, therefore, who endeavour to bring the art of Surgery to perfection, ought to depart from, and recur to Observation, in order to confirm the consequences which they deduce from physical Experiments.

This procedure of the mind would not be difficult, if no more was to be done than to reconcile some Observations with some Experiments. But at first setting out, difficulties occur on all sides: the most simple truths require a long series of Observation and physical
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Experiments, and when these Observations and Experiments are grown very numerous, their relations and the consequences resulting from them must be sought for. After these first Efforts, we are still so little advanced, as only to arrive at an imperfect Knowledge, and when truth appears more clearly, we hardly ever see its boundaries or consequences; so that we must wait patiently till fresh facts enlarge our knowledge. Thus, after some progress, we enter into a new course of Experiments, Facts and Observations.

As we advance in our knowledge of some diseases, we meet with proofs of the vast pains which new discoveries cost the mind. Contusions on the head often proved mortal. The first step to be taken in such an accident, was to seek for its causes by an anatomical Inspection. From dissecting dead bodies, Surgeons learn'd, that extravasations of blood occasioned the death of wounded persons: whence they concluded, that it was necessary to open the cranium, in order to discharge the extravasated fluid. But from other inquiries it appeared, that extravasations are not the only assignable causes of death; for others, not less fatal, have been discovered, and in which no relief could be had, but from the Trepan. Besides, more violent blows or contusions than those which sometimes cause extravasations, and are succeeded likewise by the most dreadful symptoms, have, nevertheless, not been attended with such accidents as endangered life. When the cranium, therefore, in such cases, has been opened by the trepan, it has been hazarding an operation as useless as it is painful, which has been neglected in other cases, not seemingly so terrible, and where it was absolutely necessary.

Such are the new difficulties which arise from Experiments, in proportion as their number increases. The violence of the contusion, and the symptoms attending it, has in all these cases been no certain sign of an extravasation, or an indication of the necessity
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of the trepan: Hence, in such a perplexing multiplicity of symptoms, the Surgeon is obliged to search for less dubious signs: now it is only by collecting and comparing all the Observations and Experiments, that more determinate and certain indications have been discovered. Perhaps other discoveries will occasion fresh doubts, which must be cleared up by further Inquiries.

It is therefore certain, that the lights which illustrate the healing art, are nothing but the result of an infinite number of practical Observations, physical Experiments, and trials suggested by both these in conjunction. But such lights are not to be expected from the Observations and Experiments of any one man. There is a necessity likewise for correcting those Observations, which are dispersed throughout the works of our predecessors and contemporaries. Without this labour, the greatest genius will make only an ignorant and presumptuous practitioner: for if he enters upon practice, without the knowledge to be met with in the writings of these authors, the building which has required the labours of so many ages to erect, will be the very structure he will rashly attempt to rear. Now can the greatest genius, and who is withal most indefatigable, flatter himself, that he alone shall be able to collect all the materials requisite to the composing such a work? Can he even collect the thousandth part of them, in the most extensive practice? Can it be imagined, that the Reflections and Observations which have exhausted so many great genius's, will occur to one person, whose life is so short, and his time besides taken up with an infinite number of different avocations? It must be owned, that the healing art is either short of perfection, or abounds with error, even in the works of the most learned authors on that subject: What must it be then in the hands of men unpossessed of those treasures which so many writers have acquired in the study of nature?

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It is no more than a contemptible sketch, which vanity, prejudice, and interest may cloak with the titles of judgment, reputation and experience; words which always impose on the multitude, and so often screen ignorance under the appearances of knowledge.

The exercise of the art, and the manner of gaining that experience whereon it is founded, manifest the weakness of attempts, which a practitioner, with no other helps than his own abilities, can make.

The particulars necessary to be known succeed each other, and fall gradually in our way. Many years must pass over a man's head, before he can flatter himself with having seen more than a small share of what is known to men, who have employed a short time in the perusal of good authors. Besides, these matters are darken'd by each other, and perpetually changing. Here nature confirms our notions, and there she contradicts them. In some cases, what appears vast, is minute; and in others, what seems to be confined within narrow bounds, is very extensive. Now if men of the greatest abilities could not distinguish truth exactly amidst so many difficulties, it is not to be imagined, that a practitioner can arrive at the knowledge of it by his own observations only.

But suppose that, in order to get the closest view of nature, a person makes himself master of all the helps which the known Observations and Experiments jointly furnish; yet this labour, joined with the largest practice, would not be enough for his purpose: for besides this, not a single discovery of all those which Surgeons make every day in the course of their practice, should escape his knowledge. Without this study, the most skilful practitioner in twenty years time will be ignorant of such particulars, as are familiar even to young Surgeons. The labours of others cut out work for him; and without a fresh study, the knowledge he has will fall into disrepute, on account of his ignorance of new discoveries.

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Continual study is as necessary in practice, as in anatomy. Now if an anatomist be not at all solicitous to inform himself of new discoveries in his art, his labours will be no more than a servile task, an imitation, a repetition of the labours of his predecessors. In vain would he flatter himself that he should be able to make new discoveries with relation to the structure of the parts. He might indeed discover something by chance, which had escaped other anatomists; but for want of being guided by the improvements that are daily made, his progress would be very slow, and perhaps he might discover nothing more than he had seen in his first dissections. There are some, who in a course of thirty years have incessantly employed themselves in dissections; and though, during that time, considerable improvements have been made in their art, yet they have remained shamefully ignorant of them.

Such were the celebrated practitioners who were cotemporary with *Harvey*. Content with the knowledge they had gained from the writings of their predecessors, they shut their eyes against the light which this great man held out to them; and followed their profession, for the greatest part of their lives, ignorant of the circulation of the blood, which discovers so many errors both in the writings and practice of the antients. Their juniors, enlightened by this discovery, justly despised these haughty practitioners, who grew old in their errors.

These sentiments run directly counter to the notions of those practitioners, whose slender experience makes them imagine, that they discover in their repeated courses of anatomy, which is their sole employment, those truths that tend to perfect the healing art. A celebrated Physician, apprehensive he should forget his art, when he was forced to leave off reading, and give himself entirely to practice, used every year to examine, not what numbers of sick
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persons he had seen, but what progress he had made in the knowledge of diseases. And the great *Boerhaave* made it an inviolable rule to divide his time between study and practice.

If Surgery requires so much pains and application, Is it not forming a wrong notion of it to reduce it to the art of manual operation? This art is doubtless essentially necessary, and is that chiefly which characterises Surgery; but considered in itself, it depends only upon a knowledge of anatomy, and a dexterity of the hand, which practice gives, but not the genius and knowledge which ought to direct and regulate it.

Those, therefore, who judge of Surgery by manual operation alone, or who believe, that it is nothing more than a long series of operations that forms a skilful Surgeon, are grossly mistaken. To form a better judgment of it, let us examine the operations as they are in themselves; and these may be reduced either to such as are described in books, or to such as vary according to the parts on which they are performed, and the diversity of cases in which they are used.

The place then of such operations as are described, is always fixed, the course of the hands is directed, and the several steps of the operator regulated. Now, can the habit that will guide a Surgeon in a road, where every step he is to take is particularly specified, and which he cannot miss, be a decisive proof of the capacity of this Surgeon? Those Surgeons who build their merit on this habit alone, at once lessen themselves, and asperse their profession: For do not young Surgeons of no great abilities, after some trials upon dead bodies, perform these described operations with as steady a hand, and as much success, as could be expected from operators to whom a long habit has render'd them familiar? And do not ignorant persons daily perform some of the nicest of these operations upon animals? Why may not they then boast of their dexterity, skill, and success?

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The best operators are therefore justly agreed, that a practitioner, servilely tied down to the rules of performing these operations, is no better than a workman attached to a wretched practice, which is often fatal to the patient, and always prejudicial to the improvement of the art, as will be made very evident by a few examples.

There have been Surgeons who, all their lives, have confined themselves to a single operation, without bringing it to perfection, but left it at their death in the very same state as when they first performed it. A *Lithotomist* who has chosen a particular method, will not venture to quit it, to have recourse to others, which in some cases would be less dangerous. He will not venture to aim even at those degrees of perfection, with which other Surgeons have practised his method. Thus it appears, that his habit or long experience is produced by timidity, or a prepossession, which makes him neglect all other methods, however safe they may be. And does not this boasted habit likewise obstruct the improvement of all other operations? When we knew no other method of stopping the blood in amputation, than the cruel application of the actual Cautery, *Parey* happily discovered, and taught us the method of tying up the vessels: but was this method embraced by those Surgeons who were habituated to dangerous or ineffectual methods? An hundred years after this very valuable discovery, their servile followers, who feared not putting the patient to intolerable pain to no purpose, were nevertheless afraid to tie up the vessels: nor could this be effected, till some able, knowing, and resolute men ventured to incur the censure, and perhaps the contempt of their cotemporaries, to bring the prepossessed back to a method so happily invented.

The antient Surgeons boldly and successfully performed the operation for the Fistula; yet, to the shame of
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those ignorant practitioners, who were slaves to the usual methods, how many difficulties were raised towards the end of the last century, about having recourse to an operation so familiar to the antient Surgeons, and which *Celsus* has so plainly described! In vain has *Aquapendente*, by treading in their steps, given us convincing examples of its success. The modern Surgeons, blindly attached to methods which were often either useless or dangerous, had not found out that the only certain cure for a fistula was cutting, or incision; and had it not been for the general apprehensions which the imminent danger of *Lewis* the fourteenth occasioned in *France*, we should perhaps still have been strangers to this operation, which has saved the lives of so many unfortunate people.

And, indeed, what mischief may not be apprehended from this habit, or rather practice, which restrains a Surgeon to one method, and occasions his proceeding in the same uniform manner, in the most different cases? Certain it is, that most of those operations, the manner of performing which is taught in books, want that simplicity which is so favourable to a settled method. Does not the Trepan, for instance, present us with abundance of variety? Are not the parts to which it is applied, and the disorders requiring its application, so very different, that in all cases they require a genius fruitful of fresh expedients? Does not the frequent application of the Trepan* depend on the diversity of cases and circumstances which accidentally occur? In a word, are we not forced to forsake prescribed rules, and look for others in the structure of the parts, and the nature of the disorder? Is it not, therefore, judgment, sagacity, and knowledge, and not a servile habit, that ought to conduct the hand of the Surgeon?

If habit cannot direct the hand in those operations
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* According to STALPART WANDER WIEL, in his observations, there have been contusions on the head, which have made it necessary to apply the trepan twenty seven times.

which are subject to stated rules, what can we expect from it in those operations which differ as much as wounds and diseases do? Is there a necessity for opening deep abscesses, penetrating into the texture of the parts to search for extraneous bodies, removing mortal strangulations, following fistulas, (the bottom of which cannot be come at by fingers or instruments) extirpating tumors surrounded by large vessels, cutting a passage through tender parts, which must be injured as little as may be, or for laying carious bones bare, which require extraordinary operations? In such cases, where the operations have no fixed place, nor any limits assigned by rule, and where the assistance of the hand ought to be regulated only by the necessity of circumstances, which always vary, What resource can be had from this habit, which is formed by nothing but the repetition of some operations that have always been performed the same way? In these diversified operations, therefore, it is, that the greatest part of the art of operating consists: whence it follows, that a surgeon who can only operate by written rules, can be of no service in those cases, which are so difficult, frequent, and dangerous.

But neither do these degrees of knowledge, which are so necessary in such cases to conduct the hand, include the whole a Surgeon ought to know, as we have already observed: for the operation which they teach how to perform, and most strikes the vulgar, is but a single step towards the cure of a disease. A knowledge of the cases that require it, the symptoms which succeed it, and the treatment, which ought to be varied according to the nature and difference of these symptoms, Are not these the essential particulars of Surgery? If, for instance, a fracture happens, accompanied with a dangerous wound, the reduction, tho' frequently very difficult, is yet but a small part of the treatment requisite in the case; as Inflammations, Obstructions, Gangrenes, Defluxions, profuse Sweats,

a Fever, Convulsions, and a Delirium, which often follow, require much more knowledge and sagacity than are needful to reduce the bones to their natural situation. A small share of practice, with the knowledge of the situation of the parts, industry and dexterity, suffice to reduce the bones; whereas a thorough insight into the animal oeconomy, the state of the wounded parts, the alterations of the fluids, and the nature of medicines, are helps hardly sufficient to remedy the symptoms succeeding such fractures.

Hence it follows, that the practice of Surgery requires a clear and thorough knowledge of the theory of the art. But the odd notions which the generality of mankind, and some Surgeons too, have had with respect to theory, make it necessary to bring them to the test. Mere speculations, and practical knowledge or experience, have been both confounded under the name of theory. By mere speculations, I mean those fictions of the imagination, those notions which are not drawn from the genuine nature of things; those principles founded upon possibilities and probabilities, those consequences which are so hastily and confidently deduced from them; such speculations can never constitute the theory of the healing art; they can produce nothing better than uncertain opinions, which nature generally contradicts, and time and reason soon make men forget. Nothing but imprudence, inconsideration, or want of judgment, can make them standing rules. From such speculations have arisen those systems which have mutually destroyed each other, and by turns amused mens minds. There have been those, that from a single truth, or a supposition, have endeavoured to deduce the healing art. A chain of arguments and consequences, built upon this tottering foundation, has often imposed upon men of the greatest parts and sagacity. Arbitrary and ingenious explanations, which furnish the imagination with answers to all difficulties, have been embraced,

embraced, as if they were illustrations dictated by nature herself.

Such is the Theory too generally received, which has infected the schools; and cannot be too much despised: it is indeed very bewitching, because it pleases the imagination, and by being so easy, dispenses with the labours and enquiries which are rewarded with a discovery of nature. The mind, blinded by vanity, is overjoyed to find in itself the principles of all things. It is in this kind of delirium, and upon imaginary foundations only, that philosophers have erected the surprising machine of the universe; that eminent practitioners have asserted, that all diseases originally proceeded either from an acid or an alkali fermentation, the thickness of the blood or lymph; and have confined the healing art to vain and fallacious indications, easy to be invented, but ineffectual in most disorders. Such are the indications that have in a manner confined practice within the narrow circle of common medicines. When a Surgeon, in compliance with custom, has ordered at random frequent bleeding, abundance of purgatives, sudorifics, and topics, he is apt to imagine, that he has exhausted the remedies of his art.

It is therefore wrong to confound those parts of knowledge, which constitute the foundation of the healing art, with those imaginary hypotheses which introduce nothing but inefficacy, error, and danger into practice. A knowledge derived from physical experiments, nature, and the operations of medicines, and founded upon the causes of diseases, the observation of their symptoms, and the laws of the animal oeconomy, constitutes the true theory: without which there is neither art nor method in the treatment of disorders. But such is the force of prejudice, that the men whose great practice will not let them study, whose ignorance reduces the healing art to a few helps known even by the vulgar; the men, I say, who affect

affect an insinuating simplicity, look with contempt upon those who divide their time between study and practice. They endeavour to bring theory into disgrace, and impose upon the publick, who are ignorant of its usefulness. Thus the grossest ignorance finds a too sure resource in credulity, to discredit that knowledge which alone can enable us to tread securely.

Theory, then, is no more than practice reduced into rules; which, however, notwithstanding the labours of so many ages, are ever restrained to a narrow compass. In these limits, where certainty forsakes us, the only guides we have left, are *analogy* and *conjecture*, and these are useful; yet, notwithstanding, nothing but those degrees of knowledge, on which they ought to be founded, can give them sufficient authority to influence the mind; and if conjecture and analogy are not established upon this foundation, they will prove fallacious guides.

In the enquiries of the mind, Conjecture and Analogy are springs of knowledge: Probability and the comparison of similar objects lead to researches, which sometimes end in the discovery of truth: but to proceed from Conjecture and Analogy to practice, as from a principle to its consequence, is a nice step, which may lead us into paths full of error and danger. This way of reasoning, therefore, ought not to be allowed men of weak and narrow understandings, and is hardly to be indulged to men of the greatest parts, and most extensive knowledge; at least, it ought not to be used without great restriction, in cases where life is at stake. It is easy to fall into error, but hard to get out of it; for the observations which might undeceive us, often confirm us in the most absurd opinions; instances of which are to be met with in all ages. The sagacious antients were misled by conjectures: they were too eager to trace things to their first causes; and in this unseasonable attempt, which the obscurity of their natural philosophy ought to have

have made them suspect, they accounted for most disorders by the principles of the then prevailing philosophy. The probability which misled, and seemed to justify them, multiplied their errors. Many of the moderns, who are extravagantly fond of systems, and whom the new discoveries might have taught more caution, have, nevertheless, run most into imaginary speculations; insomuch, that conjecture has led them into abundance of gross mistakes, and the healing art, in their opinion, seems to have been only the dangerous art of forming conjectures. And Analogy has betrayed them into still more unaccountable errors; thus they rashly and obstinately gave the *Peruvian Bark*, which experience had devoted to the cure of intermittent fevers, in continual, malignant, and hectic fevers, and those caused by suppurations, &c. After having discovered the good effects of Mercury in venereal, and some other disorders, they doubted not but it might prove an universal remedy in all chronical disorders; and instead of confining themselves to simple experiments, conducted by prudence, they gave it plentifully and boldly in Cancers, Ulcers, the Scurvy, &c. as an infallible remedy. These destructive errors, which they could not part with, have spread further, by being perpetuated in works which impose on the credulous and ignorant. But notwithstanding Conjecture and Analogy have been much misapplied, and, it must be own'd, may mislead weak and injudicious persons, yet they may furnish the cautious and able Surgeon with good hints and expedients.

In the profound knowledge which is the foundation of Surgery, consist the merit and difficulty of the art; which at the same time shews from what hands we are to expect its improvement. Excellent Surgeons are as hard to be met with, as genius and learning, of which the former is the source of knowledge, the universal instrument; but (if I may be allowed the expression) like the body, it becomes dull and languid

languid when it is not exercised. The uncultivated mind is as incapable of distinguishing objects, perceiving their connections, and exactly following a chain of reasoning, as the body is of agility and plianthness, after a long disuse of exercise. The mind then must be prepared to enter into Surgery, as well as into other Sciences: for, previous to the study of it, there is required a competent share of that kind of knowledge, which explains the operations of nature, and without which, there is no arriving at those truths that constitute the rules which ought to guide the Surgeon in the cure of diseases.

The improvement of Surgery is wholly owing to those Surgeons that follow'd these rules, of which number were *Lanfrank*, *Berengarius*, *Vidus-Vidius*, *Severinus*, *Fallopious*, *Vesalius*, *Hieronymus ab Aquapendente*, *Paræus*, *Magatus*, *Fabricius*, *Guillemeau*, *Pigray*, *Demarque*, *Thevenin*, *Scultetus*, and *Nuck*.^{*} These eminent men, whose minds were prepared by the study of the learned languages, cultivated by polite literature, and enriched with philosophical knowledge, illustrated all the intricacies of Surgery. It cannot however be denied, that there have been men, who, without any other assistance than their own genius, left behind them lasting proofs of their skill in Surgery: but such prodigies are rare, and the art would be confined within a very narrow compass, if its improvements could proceed only from a single source, which nature opens so seldom.

The labours of these skilful practitioners hasten'd the progress of Surgery: but if Surgeons had joined their efforts, and formed societies for further inquiries, would not its progress have been still more rapid? How many Surgeons have buried valuable discoveries with them, which would not have been lost, had they

^{*} These illustrious men united the title of Physician to that of Surgeon; because, in most foreign universities, Physick is not separated from Surgery, as it is in the university of *Paris*.

been deposited with, and published by some learned Society! Men of generosity, who had been the wiser for them, would afterwards have enriched their own works and posterity with them; and these discoveries would have been more correct, as upon their first publication they would have been liable to a rigid examination; and, lastly, they would have laid a foundation for new discoveries, by exciting emulation and curiosity in others. Many are the advantages which Surgery has received from such Societies, and which are never to be had from the labours of particulars: they are a kind of tribunals, which call for the labours of the learned from all parts, in order to consign them to publick use, and the improvement of the Sciences. They establish a commerce, in which the publick gains more than those who carry it on; and the fund never fails, but remains from age to age a fruitful source of further improvements.

To collect these treasures, and improve this fund, already so large and extensive, was the *Academy of SURGERY* established; this was the only advantage that Surgery could envy the other Sciences. And though this society is but lately erected, Surgery finds its advantage, even in the delay; since other learned societies have been preparing materials that will contribute to perfect it. Every branch of science had been cultivated with great care and application. Natural philosophy is enrich'd by numberless discoveries; Anatomy has exhibited to us the curious structure of the organs; Chymistry, the constituent parts and composition of mixt substances; and Mechanics, in their present state of perfection, may assist men of genius and industry, in making such instruments and machines as multiply powers. It was time to employ these discoveries for the improvement of Surgery. The antients wanted most of these helps: they studied only the outside of nature, and knew no more of her, than she presented to their observation.

tion. Our art, therefore, which meets with so many helps in the labours of the moderns, may consequently make such advances, as could not formerly be expected.

The plan proposed by the Academy, is to establish Surgery upon Observations, Physical Experiments, and Experience. In the use we shall make of these, we shall follow the rules already laid down. But the best part of its treasures will consist of Observations, of which the most common need not be rejected, because they always contain a detail of different circumstances, that are often more beneficial than the principal thing which drew the attention of the Observer: at the same time, we shall not neglect other Observations, which may possibly be suspected, on account of their marvellous nature. Now if the marvellous has oftentimes imposed upon credulity, it must be owned, that incredulity has sometimes without reason rejected the marvellous. But such Observations, notwithstanding their exhibiting appearances which seem'd to deviate from the ordinary course of nature, have in time been verified by a succession of facts so well attested, as to leave no room for any*doubt. Such are those observations which evince the adherence of Stones to the bladder *a*, the success of the *Cæsarean* Operation *b*, and Bronchotomy *c*; also the possibility of Hernias through the Foramen Ovale *d*. Thus Nature, by disclosing herself sometimes to men, opens them, against their will, new paths, which, by reason of their obstinate prepossessions, they could not see before, and which lead to a scientific knowledge of the healing art.

* Those who send us Observations of this kind, are desired to support them with all the requisite Attestations, in order to their being presented to the public.

a See *Memoir* xiii. *b* *Memoir* xx. *c* p. 457. *d* *Memoir* xxv.

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MEMOIRS

OF THE

Royal Academy of SURGERY at PARIS.

MEMOIR I. By M. PETIT.

ARTICLE I.

Remarks on Tumors formed by the Retention of the Bile in the Gall-bladder.

DISORDERS do not always discover themselves so distinctly as not sometimes to be mistaken, especially when they are complicated, because then the numerous train of concomitant symptoms begets uncertainty, and often leads into error. We meet with too many instances of this fatal truth, when we endeavour to distinguish the kind and genuine character of most of the apostems formed in the cavity of the abdomen. The difficulty here proceeds not only from these apostems being less visible and palpable, than those of the external parts, but also, because, in most, the symptoms are generally confounded with those of various other disorders, which accompany them, and are usually either the causes or consequences of them. This consideration has induced me to relate some cases in which these disorders have been mistaken, and afterwards to lay down the method of avoiding error on the like occasions.

About twenty seven years ago, a lady had a tumor in the region of her liver, of so considerable a size, and accompanied with so sensible a fluctuation, that it was taken for an encysted dropsy, and tapping accordingly performed; but,

I. Observation by M. Petit, on a tumor of the gall-bladder taken for an abscess of the liver.

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instead of serum, it discharged two pints of very green and glutinous bile.

A few days afterwards, I was informed that a tumor, which was thought to be an abscess of the liver, being opened, instead of pus, discharged about a pint of green bile. I used my best endeavour to inform myself of the beginning and progress of these two disorders, but could learn nothing more than that both proved mortal. These observations, tho' imperfect, were of use to me.

II. Observation
by M. Petit on a
similar tumor.

Some months after, I was called in consultation with several physicians and surgeons, to give my opinion of the nature of a tumor of the liver. After we had had a detail of every thing that had happened during the twenty days the disease had lasted, the gentlemen in consultation concluded it was an abscess, and ought to be open'd, and appointed me to perform the operation.

III. Observation
by M. Petit, on a
tumor of the
same nature.

I had hardly divided the skin, when I perceived a subsiding and diminution of the tumor, which recalled to my mind the idea of the bilious tumors just mentioned. I did not finish the operation, but, on the contrary, brought the lips of the wound together, in order to re-unite them. The gentlemen, astonish'd at this procedure, ask'd me why I did not lay the abscess open to the bottom; upon which I told them what I had perceiv'd, and added, that, if I was not mistaken, the suppos'd abscess was nothing more than the bile retain'd in the gall-bladder; and that the reason of the tumor's disappearance during the operation, was, because the bile began to be discharged, and actually ran out, and that the patient would soon evacuate it by the usual passages. Accordingly, as soon as the wound was dress'd, the patient having an inclination to go to stool, parted with a large quantity of green bile,
and

and in four or five days, both the small wound I had made, and the supposed abscess were cured.

After considering these facts, I recollected all the symptoms which may accompany disorders of this kind, made different combinations of them, and imagined that I had found the signs which characterise them; and, in reality, they have been highly useful to me in practice.

Some time ago I was called in consultation to a lady, afflicted with a tumor on the region of the liver, which was reckon'd an abscess, and the opening of it accordingly proposed; but, on the contrary, I judged that the disorder was not a suppurated phlegmon, but a tumor produced by the retention of the bile in the gall-bladder: And the reasons I advanced made one of the gentlemen embrace my opinion, but the rest followed their own. The tumor was opened without me, and I neither knew how it was open'd, nor the quality of the matter it discharged, but only learnt, by public report, that the wound remained fistulous.

Seven or eight months afterwards, the patient consulted me for the cure of her fistula, which discharged a yellowish liquor; and it being of importance to know what it was, I was induced to taste it; and from thence concluded it was pure bile. I have not seen the lady since, but have been informed that the fistula was dilated, and a bilious stone extracted, as such are often form'd in the gall-bladder; but I needed not this last circumstance to confirm me in the idea I had of this kind of disorder.

IV. Observation
by M. Petit, on
the same subject.

About eight or ten months ago I was desired to be present at the opening an apostem in the region of the liver. The patient had been seized with an inflammatory disposition of the abdomen,

V. Observation
by M. Petit, on
the same subject.

accompanied with a painful tension of the region of the liver; and a proper diet and liquors, some clysters, and especially two bleedings in the space of twelve hours, had given such considerable relief, that the patient thought he might safely leave off medicines. But he was mistaken; for the inflammation of the abdomen, and the pain of the liver return'd, and from this time time the feces had no tincture of bile, whilst the urine on the contrary was so loaded with it, as to appear brown. In twenty four hours, the whole surface of the body appeared as yellow as saffron, and a continual fever, with irregular shiverings, accompanied all these symptoms. Several bleedings, simple broths, aperitive diluents, laxatives, and proper topics were all us'd, by which means the patient was reliev'd, the abdomen soften'd, and the region of the liver render'd less painful; but there appear'd on it a very considerable tumor, in which the fluctuation was so sensible, that it seem'd absolutely necessary to open it speedily.

Nevertheless, the circumstances of this disease, which seem'd most peculiarly to denote an abscess, did not appear satisfactory enough to me; on the contrary, I perceiv'd that the tumor was only the consequence of the retention of the bile, which passing no longer thro' the *ductus cholodochus*, had dilated the gall-bladder to such a size, as to make it push the teguments of the abdomen outwards; whence arose the external tumor visible to the eye, and the fluctuation, which was so very manifest to the touch.

When I had related the reasons on which I founded my sentiment, the gentlemen present were of my opinion, and all thoughts of opening it were laid aside. Besides, the symptoms were not now so urgent, and it was agreed that the patient should be kept to the same regimen and medicines he had us'd for
some

some days past. Next night the patient voided some feces a little ting'd with bile, and urine of a less brownish colour; and from this time, the bile gradually flow'd so well, that in three days after they shewed us three pints, of a very greenish bilious matter, which the patient had discharg'd during the night. We found the tumor considerably diminish'd, and no longer painful. At last it disappeared totally, the urine resum'd its natural colour, the jaundice vanish'd, and the patient was quite cured in a short time.

I have frequently communicated different observations of this kind to the public; and such cases are more common than is generally thought, and, perhaps, the mistakes I have related will only appear new, because the first who fell into them pass'd them over in silence: But mistakes, in such difficult cases, are only oversights, when we have the courage to publish them; but become crimes, when through pride we conceal them.

However, curious as these observations may appear, they would nevertheless be of little use, if I should not relate the marks, or signs, by which we may distinguish these two different disorders.

It is first to be observed, that an abscess of the liver, and the retention of the bile in the gall-bladder, being most generally the consequences of an inflammation of these parts, it is not surprising that the first beginning of these disorders should appear alike; for, in reality, both begin with a painful tension of the abdomen, especially in the region of the liver. Afterwards, the bile is retain'd in its strainers, or only flows very imperfectly into the intestines. It mixes with most of the other humors of the body, whence arise, a bitterness of the mouth, great thirst

Signs or conjectures by which we may distinguish these tumors from abscesses of the liver, or, by which we may at least be taught such a degree of circumspection as may hinder us from deciding rashly.

and nauséas ; the urine is ting'd with bile, and sometimes so considerably loaden with it, as to appear of a brown colour ; whereas the feces which are deprived of the bile, look greyish or whitish. The bile spreads itself thro' every part of the body, even to the white of the eyes, and the whole body becomes yellow. The patients are afflicted with a general itching, and disturb'd and interrupted sleeps ; a fever succeeds, and a hiccup, and vomiting ; and several other symptoms, which need not be enumerated here, meet in the beginning of an inflammation of the liver, because this inflammation attacks the strainers of the bile.

If these symptoms continue and increase till the state or height, then the disorder will assume different appearances, according to the manner in which the inflammation will terminate.

If the inflammation be terminated by suppuration, and the suppuration be finished, the pain and fever will be diminish'd, the patient will have irregular shiverings, and a tumor will appear on the right hypochondrium ; and when the abscess is form'd on the convex part of this organ, this tumor becomes soft, and the fluctuation of the pus it contains may be felt. These signs indicate the formation of the abscess, and the necessity of opening it. However, before we come to a determination, we ought to examine every symptom, and recollect and consider every thing that has pass'd during the course of the disorder ; for notwithstanding all these appearances of an abscess, we may be deceiv'd ; because, sometimes, all the marks or signs of an abscess I have now mention'd, seemingly appear where there is no abscess ; but, on the contrary, the inflammation of the liver is terminated by resolution.

To comprehend the possibility of this, we must observe, that the bile, which, during the height of
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the inflammation, was not filtrated in the glands of the liver, begins to be separated as soon as the resolution has sufficiently disengag'd the glands of this organ. But if the resolution is not enough advanc'd to open the obstructed *ductus cholodochus*, the bile, which will enter the gall-bladder, cannot flow out, but will fill it, and be so accumulated in it as to push it outwards, and will occasion a tumor under the right hypochondrium, accompanied with a manifest fluctuation; this, joined with the irregular shiverings, and the abatement of the fever and pain, afford us signs like those of an abscess.

In this perplexing state, shall the surgeon run the hazard of opening the gall-bladder, in the supposition of opening an abscess; or shall he suffer the patient to die of the abscess, for fear of opening the gall-bladder? If this likeness of symptoms be capable of setting him wrong, yet an accurate and well-weigh'd comparison may shew such differences, as are not indeed discoverable at first view, but which are nevertheless sufficient to enable him to form a right judgment.

In a word, the abatements of the pain and fever, are equally the signs of a resolution, begun, as of a finish'd suppuration. But it is to be observ'd,
1. That the pain, which should have been equal in the two disorders, whilst both were only inflammations in their height, and as yet as much disposed to suppuration as to resolution, increas'd whilst the abscess was forming, and abated whilst the resolution was carrying on, and the bile was obstructed and accumulated in the gall-bladder. 2. The pain which accompanies suppuration is generally throbbing, and this kind of pain does not accompany tumors of the gall-bladder, as they do not generally happen, but when the inflammation of the liver terminates by resolution. 3. The pain abates much sooner when apostems terminate by re-

resolution, than when they end by suppuration. 4. The abatement of the pain, in consequence of the resolution, leaves the patient in a pleasing and hopeful state, whereas, notwithstanding the abatement of pain in consequence of a finish'd suppuration, he is always low-spirited, and so uneasy, that the worst is to be apprehended.

The irregular shiverings, in both cases, do also differ; for, 1. Those which accompany the formation of an abscess, last longer than those produc'd by a retention of the bile. 2. In the former the pulse is small, and becomes more elevated when the shivering ceases. 3. The shivering attending suppuration is succeeded by an heat, and then by a moisture of the skin; whereas, after the shivering caused by a retention of the bile, the skin is dry; so that this last ought not to be looked upon as a true shivering, but as a transient irritation which the diffus'd bile makes on the membranes and other nervous parts.

When an abscess of the liver is forming on the convex part of this organ, or when the bile is retain'd in the gall-bladder, the teguments are thrust outwards, and we perceive a tumor on the right hypochondrium, but the tumor caus'd by an abscess differs from the other; for 1. It is not limited, but appears to be included in the neighbouring parts, and as it were buried in the teguments, which are generally oedematous; whereas the tumor occasion'd by the distention of the gall-bladder is exactly distinct and apparent, because it is rarely accompanied with an oedema. 2. The tumor formed by the gall-bladder is always situated below the spurious ribs, under the *musculus rectus*; whereas the tumor arising from an abscess of the liver, has no particular situation, and may undistinguishingly possess all the parts of the epigastric region.

Lastly, the fluctuation of the contents of these
two

two tumors discovers itself in a different manner ; for, 1. The fluctuation from the retention of the bile in the gall-bladder, is perceiv'd almost suddenly, whereas that of an abscess is long before it appears. 2. The fluctuation of an abscess is suspected long before it appears, whereas that of the bile discovers itself generally before it is suspected. 3. The fluctuation of a bilious tumor, even in the beginning, is not dubious, whereas that of an abscess, especially in the beginning, is such, that if several persons feel it, they are divided in their sentiments ; and some even deny that there is any at all. 4. The fluctuation of an abscess appears not at first, but in the center of the tumor, and extends every day to the circumference as the suppuration increases ; whereas the fluctuation of a tumor of the gall-bladder is at first almost as perceptible in the circumference as in the center ; which happens because the bile included in the gall-bladder is fluid from its first retention, whereas the matter of an abscess does not become fluid but in proportion as it is changed into pus. 5. To whatever degree the suppuration of an abscess of the liver is carried, its circumference is always hard and swell'd, whereas in a tumor of the gall-bladder, when the inflammation is over, there is generally neither hardness nor swelling about its circumference.

These are the distinguishing marks which I have collected from amongst those which appear the same, and may be found together in very different disorders. I thought it expedient to examine them separately, before I consider'd the same symptoms, when an abscess of the liver, a retention of the bile, and bilious stones meet together. And that the reader may reap more advantage from the observations I have made on this subject, I judg'd it incumbent on me, to compare the disorders of the gall-bladder with those of the urinary bladder.

ARTICLE II.

A comparison between the retention of the bile and stones in the gall-bladder, and the retention of urine and stones in the urinary bladder.

TIS analogy that empowers us to do some things that we never did before, because they have some relation with other things that we do habitually. Thus, for instance, because the itch and cutaneous ulcers, which are cured by mercurial ointments, resembled certain symptoms of the venereal disease, *Vigo* and *Carpi* imagined that the same application might be proper in this disorder. To this happy conjecture we owe the discovery of a specific against this dreadful distemper; which single circumstance proves the necessity of setting ourselves to consider the true relations and differences amongst diseases, of the same, as well as of a different kind; and as the disorders of the gall-bladder, which are but little known, do in some measure resemble those of the urinary bladder, with which we are better acquainted, we shall try to discover the true signs of the former, and the proper method of curing them, by comparing them with the latter.

We know thus much already, that the gall-bladder is subject to retain the bile, and to contain stones, as appears from the preceding observations, which I read in a public assembly in 1733. We know that the urinary bladder is subject to the stone, and to a retention of the urine; that the urine which cannot be discharged, by its quantity produces excessive distensions; and by its acrimony, irritations, succeeded by inflammations; and that these inflammations often terminate in gangrenous abscesses. In like manner, the bile retain'd in the gall-bladder, by its quantity or continuance there, occasions inflammations, which terminate in gangrenous abscesses,

scesses, which prove mortal, when for want of knowing them the patient is left to his fate.

We likewise know that stones in the gall-bladder may either remain there, or be discharg'd by passing thro' the cystic duct, and thence into the *ductus choledochus*, and also by stopping in either of these ducts, may occasion a retention of the bile. In a word, these biliary stones may be discharg'd from these ducts, and fall into the *duodenum*, in the same manner, as some urinary stones may remain in the bladder, and produce a retention of urine, whilst others force open the neck of the bladder, get into the *urethra*, and sometimes remain there, or come away with the urine. Stones of the gall-bladder, dropt into the intestines, have often been found among the feces, and we frequently find those in the urine which are discharged from the bladder thro' the *urethra*. Both these kinds of stones do sometimes pass thro' their respective ducts without giving any pain, because they are small and smooth, whilst such as are rough and much larger stick therein, and sometimes till death, unless they are extracted. There are, however, stones which remain both in the urinary and gall-bladder, without producing any bad symptoms, because they may either be so shap'd, or so situated, as not to obstruct the natural course of the urine or the bile. I have found a considerable number of stones in several bodies, which I have dissected in both these bladders, which the persons when alive knew nothing of, because they had never occasion'd the least accident during life; but this is not common, for most persons who have such stones suffer considerably by them.

Stones of the gall-bladder, compar'd with those of the urinary bladder.

The symptoms accompanying these disorders may well make us suspect the existence of such stones, and by searching with the catheter, we may even be certain

certain of the presence of urinary stones ; but it does not seem possible to use the same method to ascertain the existence of bilious stones lodged in the gall-bladder ; in which case we must be content with the suspicion arising from the present or preceding symptoms. These stones indeed may sometimes be perceived by the touch, when the patients are lean, and the stones large, or many of them together. In this case, by touching the tumor form'd in the region of the gall-bladder by such a collection of stones, we perceive a kind of crashing, and even hear a noise like that of nuts included in a bag, as hath been frequently observ'd. We shall, however, afterwards shew, that there are particular cases in which we may easily search the gall-bladder, and by means of the probe discover the stones therein contain'd.

Having compar'd the stones of these two bladders, we proceed to compare the retention of the bile with that of the urine. The natural structure and use of these two bladders establishes the analogy between these two disorders, and their situation, and the character and use of their respective fluids, constitute the differences.

When there is no obstruction in the urinary or biliary ducts, these two bladders fill, and their contents are retained by their sphincters, till they come to a sufficient quantity to excite the fleshy fibres of these two bladders to contract, in order to evacuate their contents ; the one the bile into the intestines through the *ductus cholodochus*, and the other the urine out of the body by the *urethra* ; and this is their natural function. But if by any cause whatever the *ductus cholodochus* does not perform its office, the bile does not pass out of the gall-bladder, and a retention of it ensues. If any cause hinders the urine to flow thro' the *urethra*, there will be a reten-

Retention of the bile in the gall-bladder, compar'd with that of the urine in the urinary bladder.

retention of urine, and neither of the bladders being able to empty itself, the fluid accumulated in it, will dilate it, and this dilation is succeeded by a painful tension, and an external tumor, which appears bigger or less according to the quantity retain'd. And if it happens that the urine, for instance, by greatly stretching the bladder, dilates, and makes its way through the *urethra*, and is in part discharg'd, then the patient, and even the physicians or surgeons, in case they neglected examining matters pretty narrowly, might imagine that, since the urine comes away, the retention has ceas'd; but they would be mistaken, since the same obstacle still subsists, and since, after this evacuation, the bladder will be found to be almost as full as it was before the coming away of that quantity of urine. What is still more apt to occasion mistakes is, that frequently, tho' the obstacle subsists, the patients make water copiously, and several times a day; and that the urine, which in retentions generally comes away drop by drop, does sometimes come away in a stream, as in the natural state; with this difference, however, that it is not a continued stream, but a very short one, and does not last long. This method of making water in retentions of urine, is precisely what we call making water by *regurgitation*: we have frequently seen the same happen in a retention of the bile in the gall-bladder. Thus the bile retain'd may, like the urine, come away by regurgitation, and in this case the tumor of the bladder must diminish. But a person who was not to attend to this diminution, and who, besides, might see the excrements ting'd with bile, might imagine that the tumor which appears on the region of the gall-bladder, was not form'd by the retention of the bile therein. But he would be mistaken, for want of knowing or remembering, that what happens in a retention of the urine, when it
flows

flows by regurgitation, may happen in like manner from a retention of the bile. The following observation will shew, that there are cases in which patients labouring under a retention of the bile, may discharge a large quantity of bilious excrements every day, though it cannot be concluded from thence that the bile has resum'd its free course, since after this evacuation the gall-bladder is almost as full of bile as it was before. What is discharg'd from it, is only by regurgitation, that is, because the obstacle hath yielded a little to the force of the compress'd fluid. This very important remark I learned from the following observation.

VI. Observation
by M. Petit, on
a tumor of the
gall-bladder occasioned by a retention of the bile.

A man of 35 or 40 years of age had for eight or ten days labour'd under an hepatic colic, which was not discover'd by his physicians, though it was from the beginning accompanied with all the symptoms produc'd by an obstruction of the liver, and a retention of the bile. The most considerable symptoms were abated by repeated bleeding, potions, and other remedies proper against an inflammation; but there still remain'd a tumor on the region of the gall-bladder, which was by turns without pain, and alternately more or less painful, more or less elevated, and accompanied with a fluctuation sometimes more and sometimes less apparent. This tumor was judg'd to be a suppurated phlegmon, and accordingly every thing prepar'd for opening it, when the patient's friends propos'd a consultation, in which the sentiments were divided. However, when they had communicated their reasons for their different sentiments, they came to an unanimous decision. Those who had the care of the patient before the consultation, were not of opinion that the tumor should be open'd, for any other reason, but because they look'd upon it as an abscess. Those who oppos'd this operation,

peration, asserted, that the tumor was form'd by the gall-bladder's being dilated by a retention of the bile. To this it was objected, that there was no reason to suspect a retention of the bile, since the patient discharg'd bilious substances by stool every day. This objection appear'd to be well grounded, and I should hardly have held out against it, if I had not frequently observed, that there are circumstances in which, tho' the bile is retain'd in the gall-bladder, yet the patients have bilious stools every day. This fact, which I related, determin'd them against opening it. In a few days the patient recover'd his strength and health, but the tumor continued for some years.

Tho' this fact appears singular, it is nevertheless a necessary consequence of the mechanism of these organs. Besides, tho' the bile is retained in the gall-bladder, there are cases in which this liquor may flow into the intestines; for example, if the obstruction of the liver vanishes entirely, but an obstruction still subsists in the cystic duct, the bile will then be retain'd in the gall-bladder; but the bile to be filtrated in the liver, may daily flow through the hepatic duct into the intestines. This was precisely the case of the last mention'd patient in the beginning of his disorder; but afterwards, when the obstruction of the cystic duct began to lessen, it was sensibly discover'd, that a part of the bile, stop'd in the gall-bladder, flow'd thro' the cystic duct; and this was still better perceiv'd, when the patient recover'd his strength; for though he appear'd entirely recover'd, yet his retention of bile was not cur'd, and during three years that I knew he follow'd his business, the tumor form'd by the gall-bladder was sometimes considerably sunk, and at others as prominent as when the disorder was at the height, but gave him no pain. He press'd it when he perceiv'd any tension in it, and diminish'd
its

its bulk, by making part of the bile flow into the intestines. This method, however, did not always succeed; but it often happen'd that, during the night, and sometimes in the day, the tumor evacuated itself spontaneously without his squeezing or perceiving it. He had sometimes notice of this evacuation by gentle gripes, which prognosticated that he would soon have a stool, and discharge a large quantity of bile. This, however, did not always happen immediately after the evacuation of his tumor, because he was often costive; and as the retain'd excrements were lodg'd in the *colon* and *rectum*, the bile could not be discharg'd till it had stimulated the intestines to expel those excrements which oppos'd its passage; and when the resistance of these excrements was considerable, he was afflicted with a colic for some time before he went to stool. From all these observations we clearly see, that in this patient, the bile retain'd in the gall-bladder, did not flow into the intestines but by regurgitation.

If in some retentions of urine or bile, these fluids may be discharg'd from their respective bladders by regurgitation; in others, it may happen that both are so exactly retain'd, that not a single drop can escape; which will produce very different symptoms. For instance, if the urine is retain'd, and cannot be evacuated, because the patient has not an opportunity of having the assistance of a skilful surgeon, he must either die, or nature must make some efforts for his relief. In such cases we frequently find gangrenous abscesses form'd in the *pubes*, the *perinaeum*, the *scrotum*, and other parts which the bladder touches in its excessive dilatation. It is universally known, that when these abscesses open spontaneously, the bladder or *urethra* are perforated, the urine comes away with the *pus*, and the patient is reliev'd and

Discharge of the
bile by regurgita-
tion.

and sometimes cur'd. It is to the largeness of the opening which the pus makes, and to the strength and goodness of the patient's constitution, that such cures are to be ascrib'd. The same accidents happen in the gall-bladder, when the bile is exactly retain'd in it. If an abscess succeeds, it extends itself, and makes different openings for itself in the adjacent parts.

Amongst the abscesses produc'd by the retention of the urine, some remain fistulous; and amongst these some have been found in which the urine has made cavities, where it deposits its gravel, which uniting, hath form'd stones of all sizes, and of different shapes. It has also been observ'd that when the urine does not remain in these cavities, but has its free course, no stone is form'd. I don't doubt but such as at first found stones in the *perinæum*, *scrotum*, buttocks, *abdomen*, and other parts in which the pus and urine had made passages, look'd upon such phænomena with astonishment: But will they be less surpriz'd, if I shew them that the bile retain'd in the gall-bladder may produce similar disorders; that the inflammation of it, communicated to the adjacent parts, makes it adhere to these parts; that by the suppuration which succeeds, and the escars it separates, this bladder is perforated; that the bile either comes away alone, or brings bilious stones with it to the adjacent and very distant parts, from that it naturally possesses; and that this is done in the same manner that the urine conveys stones to all the parts where it comes?

In my first observations on this subject, three examples might have been observ'd, in which a tumor of the gall-bladder was open'd by those that mistook it for an abscess. Death soon succeeded the operation in the two first patients; but

Discharge of the bile procured by abscesses, succeeded by fistulas.

Openings of the gall-bladder succeeded by extravasations of the bile into the abdomen, which have proved mortal.

that perform'd on the third, was follow'd by no dangerous symptom. The symptoms preceding the death of the two first, were violent pains, a tension of the *abdomen*, the hiccup, vomiting, and other symptoms, which can justly be ascrib'd to nothing else but the extravasation of the bile into the cavity of the *abdomen*, and the action of that fluid upon all the *viscera*. In pursuance of our design we proceeded to shew how important it is, not to resolve upon opening these tumors, till we have deliberately and attentively considered both their origin and progress, and likewise the variation of their symptoms.

What I have said is sufficient to check the forwardness of young operators, who are always for cutting. But on the other hand it must be noted that an unseasonable timidity ought not to prevail so far as to make them lose the opportunity of operating, even in cases where they are persuaded that the tumor is form'd by the dilatation of the gall-bladder, occasioned by a retention of the bile, for if the two first observations shew that some of these tumors cannot be open'd without destroying the patient, the third proves that there are others which may be open'd with safety. It would therefore be useful to deliver the signs, by which they might distinctly discover these different cases, so that they might act, or decline acting, with a knowledge of the cause, which is no easy matter. Nevertheless, to perform it as well as I can, I shall proceed to inquire whence it happen'd that the patient mention'd in the third observation was reliev'd by the opening of his tumor, and why the operation was succeeded by no bad symptom, except that he could seldom have a stool without a glyster. We shall endeavour to clear up all the doubts which may be raised on this subject.

We

We conceive at first view, that if the patients mention'd in the two first observations perish'd by an extravasation of bile into the cavity of the *abdomen*, the patient mention'd in the third must have had some particular disposition which prevented such an extravasation; for if the bile had fallen into the cavity of the *abdomen*, as it did in the other two cases, it would certainly have produc'd the same symptoms. Now I know of nothing but the adhesion of the gall-bladder to the *peritonæum*, which can hinder such an extravasation; whence we may conclude that in the present case the gall-bladder adher'd to that part of the *peritonæum* where the opening was made, and of course that we ought to entertain the same notion of these tumors as of abscesses of the liver, which is, that they may be safely open'd when the gall-bladder adheres to that part of the *peritonæum* where we intend to make the incision. When M. Mery thought of the puncture of the urinary bladder in such a retention of urine, where the catheter could not enter it, he judiciously chose that side of the bladder above the *pubes*, which is not cover'd with the *peritonæum*, and the cellular texture of which immediately connects it to the other teguments of the *abdomen*; for the difficulty is the same in these two sorts of punctures, as in opening abscesses of the *abdomen*. It being of little signification to discover them by the preceding signs, and the most manifest fluctuation, as we still run a great hazard in opening them, unless we are fully convinc'd of the adherence of the tumor to the *peritonæum*. The opening the bodies of those who have died on the same day, or the day after the operation, has often confirm'd this truth.

Why the gall-bladder may sometimes be open'd without an extravasation of the bile into the *abdomen*.

Thus in order to avoid falling into this perplexing case, and prevent our having any thing to reproach ourselves

ourselves with, before we undertake the opening or puncture of the gall-bladder, we should be certain it adheres to the teguments, and know where the adhesion is, in order to make choice of the fittest place for the opening, when the operation is judg'd necessary: But how shall we be assur'd there is such an adherence? The following observations will perhaps afford us some light in this particular.

VII. Observation on an abscess of the liver, which had a communication with the gall-bladder and the colon.

A gentlewoman about thirty years of age having been subject to an hepatic colic for some years, was frequently in imminent danger of death by the violence of some of the fits: In most of which she complain'd of an intense pain in the region of the gall-bladder, in which, notwithstanding her bulk (for she was very fat) I distinguish'd by the touch a tumor form'd by the fulness of the gall-bladder. But the last fit was so violent, and the tension and inflation of the whole *abdomen* so sudden and great, that no fluctuation could be perceiv'd. Notwithstanding all attempts to relieve the patient the disorder increased, and she was two days senseless, and extremely debilitated; but on the seventh day of the fit the pain was almost quite gone. As the rest of the

Discharge of the matter of an abscess with the bile by stool.

symptoms, however, continued, there was reason to fear a gangrene of all the *viscera*, and we had no hopes of the patient's life, when several copious stools in the night considerably reliev'd her. She discharged a yellowish matter, but in too large a quantity and too pale to be thought bilious only; and in reality purulent matter was found mix'd with the bile, which made us judge that there was a retention of the bile, and an abscess at the same time. These evacuations abated in the day, and next night the patient slept without going to stool; and by using a proper regimen was cur'd in a few days. After having

having liv'd seven years without the least symptom of her colic, she was seiz'd with a malignant fever, which being neglected, because she was on her road to *Paris*, prov'd mortal there.

Being more curious to investigate the marks of the disease, of which nature had formerly cur'd her, than to inquire into the effects produc'd by that which destroy'd her, I open'd her *abdomen*, and chiefly examin'd the liver and gall-bladder, both which were found adhering to the arch of the *colon*, and that to the *peritonæum*, the length of three inches; and I found the gall-bladder so small, that a stone as big as a nutmeg quite fill'd it. This stone adher'd to all the sides of the bladder, without leaving room for a single drop of bile, so that this fluid flow'd into the intestine through the hepatic duct alone.

This observation is fruitful of particulars, whence proper inferences may be deduc'd to illustrate the present subject. First it must be observ'd, that the liver and gall-bladder in this patient adher'd to

Adherence of the liver to the gall-bladder, and of the gall bladder to the *colon*.

the *peritonæum* and the *colon*. Now as an inflammation is the principal cause of the adherence of these parts, we may be certain, or at least it may be presum'd, that there is always an adherence in the parts of the *abdomen* where the *viscera* have been inflam'd, especially when the inflammation has often attack'd the same parts at different times, which was the case of the patient whose history I have now given, who in the course of eight or ten years had had more than twenty fits of the colic, in each of which the region of the gall-bladder was swell'd, hard and painful. So that it was natural to conclude that the parts affected in the last fit of this disorder, adher'd to each other; and it is certain that the tumor might have been safely open'd, if the suppurated phlegmon, with which it was com-

plicated,

plicated, had discover'd itself by a sensible fluctuation, which was not the case, as we have observ'd.

A lady of about sixty-six years of age, who had been subject to an hepatic colic, with a retention of bile in the gall-bladder for some years, was seiz'd with a tumor on the right *hypocondrium*, which inflam'd, suppurated, and burst outwardly, and so reliev'd the patient. The opening became fistulous, and for a long time discharg'd only a limpid matter, but at last bile flow'd from it. The fistular cavity clos'd and open'd alternately; and the length of the disease, the fever, and the little nourishment the patient took, &c. put an end to her life. Upon opening her body, the gall-bladder was found adherent as in the preceding case†.

Fistula which penetrated into the gall-bladder, and afforded a passage for the bile.

These two observations resemble each other in many circumstances. Both patients were for a long time afflicted with an hepatic colic, and had a retention of the bile, a bilious tumor, a phlegmonous inflammation and suppuration; and both were reliev'd by the evacuation of the pus. But if the procedure of nature was the same, she did not follow the same road; since in one of the patients the abscess burst inwardly, and penetrated the intestinal channel, whereas in the other the pus made its way outwardly, by penetrating the muscles and the skin of the *abdomen*; but a circumstance in which these two tumors still resemble each other, and to which we are chiefly to attend in the present case, is that, upon opening both bodies, we found the gall-bladder adhering to the *peritonæum*, so that both cases prove, that in hepatic colics, accompanied with inflammation, the affected parts must contract adherences, and may be open'd, if necessary, without any apprehension of an extravasation.

The adherence of the gall-bladder with the *peritonæum* may permit an external aperture to give vent to the bile.

To

† See afterwards M. Dargeat's observation on this disorder.

To this proof or sign we shall add the following:

1. That if the patient lies on his left side, with his legs drawn up to his belly, and in this situation we strive to push the tumor from one side to the other, and we find it cannot be remov'd from the spot where it rises, it is a sign that it is adherent; whereas on the contrary it is a certain sign that it is not adherent, if it follows the motion of the fingers, and can be mov'd from side to side. 2. If there be a swelling œdema, or redness of the external part of the tumor, though these symptoms have only appear'd in some of the preceding attacks of the hepatic colic, we may be then certain that the tumor is adherent. In a word, if the surgeon has seen the patient in several of his fits, and made the strictest inquiry into the symptoms, he can hardly miss being satisfied in all these particulars, and being thence convinc'd that the tumor is adherent, and the patient in danger, he ought not to delay opening the gall-bladder; for it is not to be expected that nature should always perform miracles, tho' indeed she begins them, because she it is that procures these adherences, and that the opening the gall-bladder where there is no adherence always proves mortal. But it is the business of a skilful surgeon to observe nature, and not to act for fear of disturbing her, when he finds that she labours successfully, and to seize the favourable opportunity of acting himself, when he finds that she requires assistance, and cannot of herself perfect the work she has begun. We ought therefore to be very attentive to all the symptoms which discover these different cases to us.

If we can be sure of the adherence of the gall-bladder to the *peritonæum*, we may safely open the tumors on that part, by which means we enrich surgery with two new operations, one

Signs of the adhesion of the gall-bladder to the *peritonæum*.

New operations which may be perform'd on the gall-bladder, in consequence of its adherence to the *peritonæum*.

of which may be perform'd when there is a retention of the bile in the extremest degree, and the patient in danger of death. This is the puncture which may be made in the gall-bladder with a trocar, in the manner invented by M. *Mery*, to procure a discharge of the urine from the urinary-bladder. He perform'd this operation frequently, and several other surgeons have done it successfully, in cases where it is impossible to introduce the catheter. The other operation whereby surgery will be enrich'd is lithotomy, which is the extraction of stones from the gall-bladder. The existence of the stone, and the adherence of the gall-bladder being known, the operation may be safely perform'd in the manner I shall afterwards describe. I shall only observe at present, that this operation may be compar'd to that perform'd on the urinary-bladder, to extract stones from it according to the method of the high apparatus.

Cases which may require the puncture of the gall-bladder.

With respect to the puncture, and even the incision of the gall-bladder, it is certain they might be useful in several of the disorders whose histories we have already given, and amongst the rest in that of the man of forty-five years of age, who died of a retention of bile, and had more than sixty stones in his gall-bladder*.

We may reasonably suppose, that if the puncture, or even an incision, had been made in the tumor sometime before, or even immediately after the appearance of the jaundice, the patient would at least have been reliev'd, or perhaps totally cur'd; and there was no danger in performing the operation, inasmuch as the gall-bladder adher'd to the *peritonæum*.

We see likewise that after the evacuation of the bile, the parts being no longer press'd, recourse might

* See M. *Leaule*'s observation on this disorder.

might have been successfully had to the proper remedies, to resolve the indurations, and remove the obstructions of the biliary strainers.

But to what purpose is it to draw off the bile from the gall-bladder, if there are stones in it, which by their number, different size and shape, are capable of blocking up the cystic duct, continuing the retention of the bile, and producing mortal symptoms?

I answer that this is the very case in which a skilful surgeon has an opportunity of shewing his judgment, when he ought to attempt the extraction of stones from the gall-bladder; but he must first be certain of their existence. We search the urinary-bladder, in order to discover the stones combin'd in it. We ought also to search the gall-bladder, and if we find any stones, must extract them as we do those of the urinary-bladder. But the question is how is this to be done? Why, in the following manner. The puncture of the gall-bladder being made with a groov'd trocar, we are to let part of the bile run off, and whilst the rest is running out, introduce into the canula of the trocar a button'd probe of a due length, and so pliable as to yield to all the inflexions necessary to make an exact search in every part of the gall-bladder. Then, if we perceive any stone, we are to withdraw the probe, and, without taking out the canula of the trocar, slip a sharp bistory into its groove, and make as large an incision as we think proper, to open at once the teguments of the gall-bladder which adheres to them. Then we are to introduce the fore-finger of the left hand into the cavity of the bladder, in order to feel for the stones, and afterwards by the assistance of the finger a pair of forceps proper for this operation. We lay hold of the stones with this instrument, and extract them, after which we make a fresh search with the finger or the probe, and

and if we find any more stones, extract them as the others; and when we are very sure there are no more, the patient is to be dress'd as we shall hereafter direct on another occasion.

As this is not a proper place to treat thoroughly of this subject, let it suffice that I have given my thoughts of this new operation. But why do I call it new? It is not so, and I do no more than make one of the operations which were perform'd upon madam *Tibergeau*, at some months distance from each other. In reality this lady had a retention of bile in the gall-bladder, which was open'd on the supposition of its being an abscess; and the wound did not reunite, but remain'd fistulous. Some months after, the patient desirous of having her fistula cur'd, submitted to the operation propos'd to her, and accordingly there was found at the bottom of the fistula, that is, in the gall-bladder, a stone as large as a pigeon's egg, which was extracted.

Is not this performing the extraction of the stone, and doing it at twice, as several lithotomists formerly cut for the stone in the bladder? Abundance of persons have died for want of knowing that they were seiz'd with this disorder, or for want of a surgeon enterprizing enough to preserve them by this operation. It may perhaps be wrong to call the surgeon enterprizing who should propose this operation, for in reality if the gall-bladder when it is adherent may be perforated without any imputation of rashness, it may be likewise search'd with safety; and if there are any stones in it, he might be justly censur'd, who should not dare to extract them, as on the contrary that operator would deserve to be highly commended who did.

The following observations, which we shall give in the author's own words, seem greatly to confirm the truths we have endeavour'd to establish.

A man

A man of forty-five years of age, after some fits of a fever, and a cold of which he seem'd to be cur'd, fell into a considerable dryness and wasting; yet he complain'd of nothing except a short dry and frequent cough; and as to the rest had a good appetite, and slept well, but the digestion was bad. Being suddenly seiz'd with an universal extravasation of bile, he call'd me to his assistance, and I examin'd the region of his liver, where at first I perceiv'd no great hardness, and the patient felt no pain in it.

VIII. Observation by M. *Leaule* on a tumor of the gall-bladder by a retention of stones and bile.

The tumor extended from the right *hypochondrium* beyond the middle of the epigastric region. His urine was copious, but turbid and red. His stools were whitish, and resembling clay. In this state, the patient, by the advice of an able physician, us'd the most proper remedies, as diluents, aperients, bitters, and gentle purgatives, but without relief. On the contrary, there appear'd another round hard tumor, situated above that before-mention'd, rising manifestly prominent above the surface of the *abdomen*, and a plaister of hemlock with gum ammoniacum was applied to it.

The patient for some time had his appetite and taste, but at last lost both, and growing weaker every day died.

Upon opening him I found a tumor form'd by the gall-bladder on the right *hypochondrium*, along the edge of the spurious ribs, as far as the middle of the epigastric region. It was of the form of a large cucumber, and its upper part adher'd to, and was cover'd by the liver. Its fore part adher'd closely to the *peritonæum* on the side of the teguments. It press'd the liver against the spurious ribs and the diaphragm, and also press'd the stomach, epiploon, and colon, and had so sunk all those parts under the

the arch of the diaphragm, that the liver had by this means lost a great deal of its thickness.

This tumor was nothing else but the gall-bladder extremely dilated. I open'd it, and it discharg'd five half pints of a very limpid, but viscid and bitter liquor, and I took sixty stones of different shapes and sizes out of it.

IX. Observation by M. Dargeat upon a scirrhus tumor which turn'd to an abscess, and was succeeded by a fistula, which penetrated into the gall-bladder, and gave vent to the bile.

A lady of about sixty-five or sixty-six years of age, was for several years subject to hepatic colics, and hypochondriacal vapours, when there appear'd on the right side of her *abdomen* a scirrhus tumor, which becoming larger and larger extended itself from the edge of the spurious, as far as the fore and upper spine of the *os ileum*.

It discover'd itself at a time when the patient was little afflicted either with her colic, or any other symptom which indicated an obstruction of the biliary strainers; for which reason she neglected herself, till being attack'd by violent fits of the colic, a nausea, a fever, and watching, she call'd for assistance.

The symptoms she then had were thought to be independent of the tumor of the *abdomen*, which to the touch appear'd only to possess the teguments. The patient was blooded, drank bitter broths, and then chalybeate waters, by which means she was reliev'd; but for near three years she had frequent returns of these symptoms, being always very constive, or having from time to time a bilious looseness, and fits of a fever, which was sometimes pretty regular, but most frequently very irregular.

The tumor of the *abdomen*, which till then had increas'd without pain, began to be painful. Emollient cataplasms were applied to it for two months, at the end of which time, the tumor having suppurated, the skin open'd spontaneously, and the

the discharge from this opening, which lasted several months, almost quite dissolv'd the scirrhus tumor; after which the fistulous opening in the skin began to close and open alternately, without any other symptoms than a slight pain in the part possessed by the tumor, and an obstruction in the teguments, which disappear'd when the fistulous opening was again open'd, and the matter flow'd, as it did immediately after the application of a cataplasm of white bread and milk. An evacuation of a limpid matter succeeded, which was at first very copious, but afterwards diminish'd, and only flow'd at intervals. Besides the pain, which the patient sometimes felt after the closing of the fistulous wound, she was from time to time afflicted with more intense pains, even whilst the pus was freely evacuated from the fistula, which for this reason was judg'd to be a symptom of the hepatic colic; and this seem'd the more probable because one day, when she was grievously afflicted with pains, the fistulous wound suddenly discharg'd a large quantity of a fluid, which, by its consistence, colour, and taste, had all the marks of bile, and during the twelve first days might have amounted to two pints. The bile came away copiously several days, but diminishing by degrees, the discharge ceased totally in about eight or ten days, and the fistulous wound of the skin closed.

After this first evacuation of bile, the fistula continued to open and shut from day to day, furnishing sometimes a simple serous suppuration, in a very small quantity, and at others pure bile more or less plentifully.

After the first evacuation of bile, the pains, the fever, nausea, and the watching abated considerably, but recurr'd in about a month, and were soon after quieted again by a second evacuation of bile, by the fistula, almost as copious as the first.

After

After the second evacuation, the discharge of bile became more frequent, and was not near so copious at each return.

The length of the disease, and especially the frequent accessions of the fever, added to the little nourishment used by the patient, occasioned a phthisis and total colliquation, which was succeeded by an universal leucophlegmatia, and a looseness which destroy'd her. Upon opening her body, her gall-bladder was found adherent as in the preceding case.

We began by introducing a probe thro' the fistulous cavity, to which the patient would not consent during her life ; and it penetrated above five inches, rising obliquely to the gall-bladder, where we found a resistance which hinder'd its going farther, and did not permit us to doubt what we at first suspected, which was that the gall-bladder was open'd. And in reality, upon opening the *abdomen*, we found that the probe enter'd a species of stretch'd ligament, which attach'd the gall-bladder to the sides of the *abdomen*, an inch and an half below the cartilaginous edges of the spurious ribs. This ligament, which was like a cord, was an inch and an half long, and hollow'd by a fistulous duct, one part of which communicated with the gall-bladder, and the other with a small purulent bag, which was situated between the two *musculi obliqui*, and emptied itself thro' the external fistula. The gall-bladder did not retain its usual form, but had several elongations, three of which were larger than the rest, in which we found certain stones lodg'd : one of them extended itself by the side of the fistulous ligament which open'd into the gall-bladder. Another was situated towards the mouth of the cystic duct, and the third lying between the other two advanc'd pretty far under the *intestinum jejunum*, to which the gall-bladder firmly adher'd. And it had
not

not only contracted an adherence with this intestine, but was also so united and confounded with the adjacent parts, that it could hardly be distinguish'd from them.

The cavity of the gall-bladder was very uneven, but not much larger than ordinary, though it was doubtless considerably dilated by the first evacuation of bile thro' the external fistula. Its membranes were very hard, and three times as thick as in a natural state.

A woman of 37 years of age, and of a brisk and sanguine constitution, having always enjoy'd good health, was seiz'd with a considerable heat of urine, and made lateritious water for fifteen days. Diluting remedies, along with a proper regimen, cool'd her urine, and render'd it clear and of a laudable quality.

X. Observation by M. de la Peyronie, on a tumor of the gall-bladder, which open'd externally, and discharg'd several stones.

Two years after she had some fits of an hepatic colic, which occasion'd violent and almost continual pain in all the epigastric region, but was most intense under the *cartilago ensiformis*.

The pain long resisted repeated bleeding, anodynes, and several other remedies; but yielded to the continuation of this method in about two months, at the end of which space there appear'd a tumor near the region of the gall-bladder. It increas'd, and extended itself by degrees along the *linea alba* of the right side, an inch above the navel, and terminating by suppuration, burst six months after its appearance. This tumor, from the gall-bladder where it began, as far as its aperture, was of the shape and size of a flattish cylinder of about an inch in diameter.

The wound furnish'd about a porringer full of purulent matter, diversified with different colours, as red, grey, and a deep green, and in which were five or six stones as large as a pea. They were
spungy

spungy and very smooth, light, brittle, and being held to a candle flam'd, and had the mark of stones form'd by the bile, and such as are frequently found in the gall-bladder.

The patient was dress'd by a country fellow with a plaister, which was secur'd by a bandage.

The suppuration was so copious for two months, that she was oblig'd to renew her dressing three or four times a day. The thick compresses she used were continually wet thro' by the discharge, which was mix'd with whitish, reddish, lymphatic, and greenish matters. The discharge of the pus, in the course of six months, brought along with it about seven or eight stones of the same nature and size with the preceding. At the end of which time I saw her, and she still complain'd of being from time to time subject to nauseas, languors, faintings, and pains like her first colic pains, but not near so violent. These symptoms appear'd when the discharge from the wound was diminish'd, but as soon as it became copious she was greatly reliev'd. The wound was fistulous, and its orifice was about a line in diameter. I introduc'd a common probe into it, which, without any great resistance, went in about four inches before it got as high as the gall-bladder, where the tumor began to appear, when the violent fits of the colic ceas'd.

The probe probably remov'd some obstacles which retain'd the matter in the gall-bladder; for, upon withdrawing it, the matter ran out plentifully, and brought along with it a stone like those already describ'd. The first discharge was white mix'd with red, and the last, with which the stone came away, was bilious, some of it was clear, and some of a deep colour.

As the length and curvature of the *sinus* hinder'd me from searching the cavity whence this stone and the matter came, I determin'd to lay it open. There

was

was no danger in doing so, because the *sinus* was in the *corpus adiposum*, and only cover'd with the skin. Accordingly after making an incision of about three inches in length, I saw pure bile discharg'd from an opening, which I observ'd near the middle of the *musculus rectus*. The blood prevented my making farther observations, so I desisted till next day, and dress'd the wound. Upon removing the dressing, the bile still came away from the opening in the *musculus rectus*. I pass'd a crooked probe into the gall-bladder, into which it enter'd so far, that I did not doubt but I had convey'd it beyond the biliary pore, thro' the cystic duct, as far as the *ductus chodochus*. The cavity, which at its beginning was very large, was considerably less about two inches farther, and even shrunk up to such a degree that the probe began to stick. When it was got to the depth of four inches it was almost fast, and the patient told me that she began to feel some pain, which made me immediately withdraw it; but as I drew out, I thought I perceiv'd some remains of a small stone.

Since this operation, which was perform'd two years ago, the bile and other matters have been no longer retain'd, but continue to flow thro' the opening in the *musculus rectus*, which adheres to the skin, where a fistula remains. Except in this particular the patient enjoys very good health, and is entirely free from the nauseas, languors, faintings, and pains, which return'd from time to time, and brought her into a languishing condition.

From what has been observ'd we may conclude,
1. That if the symptoms return, and depend on some stones retain'd in the gall-bladder, we may, as able surgeons have done in like cases, extract these stones thro' the opening of the fistula, by dilating it sufficiently with prepar'd sponge, or other remedies. 2. That if these symptoms return in

consequence of an inspissated bile, retain'd in the gall-bladder, or in the passages which ought to convey it to the intestines, we may attempt to dilate it by proper injections, and either evacuate it thro' the fistula, or cause it to flow thro' the *ductus choledochus* into the intestines, which is its natural road.

This observation, amongst other things, demonstrates the possibility there is, in some cases, of extracting stones from the gall-bladder with success, as we do from the urinary bladder.

A woman of *Bellgrade* in *Gatinois*, of seventy-four years of age, had a colic, which was succeeded by an universal jaundice. She was frequently blooded, and used diluents, aperients, and gentle purgatives, which abated the symptoms; but afterwards a tumor appear'd on her right *hypochondrium*, which became an abscess, and left a fistula, which clos'd up from time to time. When this fistula was shut up the patient had violent pains, which were greatly reliev'd when it open'd again.

I had the management of this woman in the beginning of this disorder, but was oblig'd to leave her before she was entirely cur'd. I saw her again about a year afterwards, and she had then a considerable tumor on the right *hypochondrium*, nearer the *vertebræ* than the middle part of that region. There was a fistula duct, which corresponded to this tumor, and opened on the side of the navel a little under it. Finding the patient in great pain, because this duct or passage was clos'd up, I push'd my probe thro' a pellicule which shut it up closely, and a considerable quantity of bloody serum ran from it, and greatly reliev'd her. In following the course of the fistula, I felt a hard body with my probe in the tumor, which seem'd to be situated upon the muscles of the *abdomen*. To discover it, I made an incision from the

XI. Observation by M. Saura, on an abscess of the *abdomen*, in which two biliary stones were found.

the opening of the fistula into the body of the tumor, and laid hold of it with my forceps, and finding it adherent, shak'd it a few times to disengage it, and extracted it, and immediately a yellow and bloody matter ran from the wound. I then cut away all the hardnesses or callosities, which I thought incapable of resolution. The hard substance which I extracted, was a biliary stone, four inches in length, and three in circumference. It was smooth at one end, and had several small cavities at the other, in which were little fleshy excrescences, which had form'd the adhesion. This operation being perform'd, I perceiv'd the opening of another duct, or passage, which went towards the opposite side, and penetrated beyond the *linea alba*, as far as the left *hypochondrium*, where there was no appearance of a tumor. I introduc'd my probe into this passage, about three or four fingers breadth, and found another stone, which I extracted, after having discover'd it, by lengthening my incision to the place where it was situated, and I cut away all the parts which I thought might retard the cure, as I had done on the other side. The wound in the right *hypochondrium* discharg'd a small quantity of bilious matter mix'd with pus for some days; but nothing particular happen'd afterwards, and the patient was perfectly cur'd in about two months.

A lady being afflicted with a jaundice, accompanied with a colic, there arose, on her right *hypochondrium*, a tumor, which at first was not very perceptible, but afterwards became very considerable. Several remedies were prescrib'd without success, till at last bathing being order'd gave her some relief. The evening after she had bath'd for the third time, she was seiz'd with a vomiting, occasion'd by the return of her colic, accompanied with convulsions, and a great discharge of blood by

XII. Observation, taken from a letter wrote by Doctor *Habert*, on a biliary stone discharged by stool.

stool. And a stone of a brownish colour, mark'd like a shark's skin almost all over, was found in her

This observation was also communicated by M. Dubamel, surgeon of Taugeres in Britany.

faeces, which weigh'd three drams and an half, was two inches and an half long, an inch and an half in diameter, and three inches and an half in circumference. It was arch'd like the roof of a vault, and smooth at both ends; which made us suspect that it was not the only one, and that there were at least two others against which it had rubb'd: Nevertheless the patient was not observ'd to discharge any more afterwards. This stone was not of the same nature with those generally found in the bladder and liver, for it was pinguious and bilious; as appear'd by this, that, notwithstanding its solidity, it was easily pierc'd by a pin, and in the hole made by the pin a yellow substance, much resembling the indurated yolk of an egg, was observable.

Sometime after the discharge of this stone, the patient parted with a kind of (putrefied) bag, or membrane, by pieces. All these symptoms are gone off, the tumor is considerably diminish'd, and the patient, who had no appetite, but contrariwise a great nausea, drinks, eats, and begins to recover.

An Abstract of several Observations on the Use of the Trepan in dubious Cases: In which an Inquiry is made into the Reasons which may induce a Surgeon, in the like Cases, to have recourse to the Trepan, or to avoid that Operation.

By M. QUESNAY.

CASE I.

AMONGST the several signs which may induce a surgeon to trepan, it is indicated by none more than fractures and depressions of the *cranium*. In certain cases these fractures are not barely simple signs, indicative of this operation, but are, themselves, causes which require it; for if there is a depression or displacing of the bones, or if the brain or its membranes be wounded by some pieces of bone, and there be not a sufficient opening in the fracture for remedying these disorders, the trepan seems indispensably necessary, in order to restore the bones to their proper place, or to raise them. We have, however, instances of patients cured in some of those cases without having been trepan'd.

Fractures and depressions of the *cranium*.

M. *Avellane* informs us, that a girl, of fourteen years of age, receiv'd a blow on the head, succeeded by a drowsiness, an inclination to vomit, and a delirium, occasion'd by a depression of the right parietal bone. These symptoms requir'd the trepan, but the girl's mother obstinately oppos'd the operation. The drowsiness and delirium lasted for three months, and kept the patient very weak, notwithstanding which, the bone rose by little and little, and all the symptoms at last totally disappear'd.

I. Observation by M. *Avellane*, surgeon, at *Geniæ*, on a depression of the *cranium*.

M. Duprey has also communicated an observation of the same kind, in which the patient was sooner cur'd, tho' his wound was more complicated. A child of

II. Observation by
M. Duprey, sur-
geon, at Evreux.

ten years old fell from an eminence fourteen feet high, and pitch'd on his head, whence arose two tumors, partly on the coronal, and partly on the parietal bones; one on the right side as large as an hen's egg, and the other on the left still larger.

M. Duprey open'd these two tumors, and found the two parietal bones uncover'd, the right the length of an inch, and the left a little more, accompanied with a fracture; one of the edges of the fracture was so depressed and separated from the other, that it permitted a spatula to be passed into the cavity of the

Fracture with de-
pression, and divi-
sion of a suture.

cranium. Besides this fracture, there was a division of the coronal suture, thro' which a probe was easily introduc'd. The depression of the bones, and the extravasation upon the *dura mater*, required the trepan, which was immediately agreed to, but nevertheless delay'd for some time, during which the operation became unnecessary. The separation of the bones, along with the posture in which M. Duprey order'd the patient to be kept, procured a discharge of the extravasated blood about the fifth day, after which the bone rose of itself, and all the symptoms disappear'd. On the fiftieth day a considerable portion of all the thickness of the external table of the left parietal bone fell off by exfoliation, and soon after the wound was cicatriz'd. The separation of the bones answer'd the end of the trepan, for the evacuation of the extravasated blood. Without this disposition, the operation would have been absolutely necessary, to make way for the evacuation of the extravasated fluid. The fracture and division of the suture suffer'd the bone to rise the more easily, for being detach'd from the
neigh-

neighbouring bone, it yielded more readily to the efforts of the brain, and the action of the *dura mater*, so that these favourable circumstances supplied the place of the trepan.

We have seen in M. *Avellane*'s observation, that the depression was also cured without the trepan; but this disorder was so long and dangerous, that instead of being discouraged, by this example, from trepanning, it should seem on the contrary to evince the necessity of doing it in a parallel case.

III. Observation by M. *Peyronie*, first surgeon to the king.

M. *de la Peyronie* likewise relates the history of a fracture cured without the trepan, the want of which tho' nature supplied, yet the cure was not so easily perform'd as if the trepan had been used.

Fracture followed by an exfoliation of all the thickness of the *cranium*.

The patient, who was more than eighty years of age, had receiv'd a blow on the middle of the parietal bone, by a door, which made such a wound, that the bone was laid bare and contus'd. The wound was dilated, and dress'd with the remedies proper to procure exfoliation. M. *de la Peyronie*, being call'd into consultation about the thirty-fifth day after the accident, found the *sinus*, which he dilated, and by this means discover'd a fracture in the *cranium*. No symptom had yet appear'd, which gave any room to suspect an extravasation; and it appear'd so long after, that there was no necessity for trepanning. It was therefore resolv'd to wait for the exfoliation; but, instead of an ordinary exfoliation, an uneven piece of bone came away, about as large as a half crown piece, consisting of the whole thickness of the *cranium*; it was separated, and fell off in three months time, which removed the fracture, and laid the *dura mater* bare. This extraordinary operation of nature supplied the place of the trepan, which would certainly have been used if the fracture had been discover'd at first, and would

not have been perform'd in vain; for, besides greatly shortening the cure, the kind of trepan which nature used in this case, shews, that tho' there was no bone displaced, nor any extravasation on the *dura mater*, yet the injury done to the *cranium* alone may require this operation. The following observation seems to confirm this remark.

IV. Observation
by M. Duverney,
on a fracture in
the base of the *cranium*, which was
not united three
months after the
wound.

A man receiv'd a blow on his head, which made no wound or contusion, but which was, however, succeeded by violent symptoms. It was determin'd to make an incision in one side of the head, but neither a fracture, nor any other injury done to the bone appear'd. Upon this, recourse was had to bleeding in the arms, feet, and jugular, and the other usual remedies, which abated the symptoms, but soon after the patient was seiz'd with convulsive startings, succeeded by so great a weakness, that he quite lost his senses, and died three months after the accident. Upon opening the part, we found a fracture in the base of the *cranium*, without any extravasation; it began at the fore part of the *mastoid apophysis*, and went across the stony apophyses, and the saddle of the sphenoid. The pieces of the fracture were separated from each other about a line's breadth; and nature seem'd to have made no effort to procure their re-union; whence we conclude that fractures, tho' not accompanied with any extravasation, may prove mortal, for want of a re-union; and, in such cases, the trepan is the only remedy, if the fracture be in a place where it can be applied. This favours the general rule, which is, that the trepan should be used wherever there is a fracture.

We ought to trepan in fractures and depressions.

We are, however, convinced by a great number of facts, related both by antient and modern surgeons, that many fractures and depressions of the *cranium* have been

been cured without the operation of the trepan. These examples have long inclin'd some practitioners to believe, that more fractures of the *cranium* might be cured without than with the trepan*. Among these practitioners there are some very eminent ones; but their testimony is for this very reason of worse consequence to those surgeons who are conducted by authority only, since this opinion is not founded upon any solid reason. If they chuse to be govern'd by the symptoms: These signs are not near so certain as those they reject, that is, as fractures and depressions of the *cranium*; for the original symptoms are often either very slight, or none appear, tho' there is an extravasation within the *cranium*, or some hurt either of the brain or its membranes; whereas very bad symptoms are often produced by a simple commotion of the brain, where the trepan is useless, as we shall afterwards shew by a great many examples. Besides, if there be either no original symptoms, or we succeed so far as to remove them by bleeding, and a proper regimen, yet we have still the consequential symptoms to apprehend; and when these appear, 'tis often too late to make use of the trepan.

Where, therefore, we have no other guide but the signs from these accidents, they are to determine in consequence the operation of the trepan, because, on supposition that there is no manifest hurt of the *cranium*, they are the only signs which can determine us how to act. But when there is a fracture or depression, we ought neither to be guided by these symptoms, nor to wait for them, because we have then sufficient and less dangerous signs than these subsequent or consequential symptoms to direct us what to do. Those who imagine that fractures and depressions of the *cranium* might often be cur'd with-

* The principal authors who have embraced this sentiment are quoted in *Palfine's anatomy*, and in *Robault's treatise of wounds*.

without using the trepan, have nothing to support their sentiment, but such observations as, we have said, evince that abundance of wounds on the head, attended with fracture and depression, have been cured without the trepan. But such observations, where nothing but the success is related, without mentioning the indications which may conduct us to it, afford very few practical helps, especially when these are contradicted by others, which are vastly superior, both in respect to their number, and the safety accruing to the patients from them. Such observations therefore can only be look'd upon as cures done by chance, or as masterly attempts, which depart from rule, and are so extraordinary, and so difficult to be ascertained, that they cannot even be propos'd as exceptions to it.

There are, however, cases which may of themselves regulate the conduct of a skilful surgeon, and engage him at least to suspend the trepan in certain fractures where no symptoms happen, and which on the contrary are accompanied with some favourable circumstances, which seem capable of supplying this operation. In the following observation, we shall see, that by acting with this caution, the trepan is not always absolutely necessary in fractures of the *cranium*, and that we may even sometimes omit making any incision to discover the fractures: But these cases are rare, and require a very skilful and prudent surgeon.

V. Observation
by M. Gallait,
surgeon of Gran-
ville, on a remark-
able fracture of the
cranium, where
the trepan was not
necessary.

A child, of five years of age, fell from an eminence twelve or fifteen feet high, upon a barn floor. M. Gallait, who was called immediately, perceiv'd that the parietal bones were fractur'd, and that each of them had its particular fracture, because the fontanel, which was not yet ossified, had probably hinder'd the communication of these two fractures, at least there was no
mark

mark of a fracture in the fontanel outwardly, whereas in the ossified part of the parietal bones, the fractures were very remarkable, because one of the pieces of the fractur'd bones rose very sensibly above the other, and yielded to the finger when pressed, and rose again upon removing it.

At the lowest extremity of both fractures, a soft tumor arose, as large as a hen's egg; which M. Gallait open'd, without laying the fractures bare, because he had no other view than to evacuate the extravasated blood they contain'd. Besides, these fractures were accompanied with no symptoms,

Division of fractures may answer the end of the trepan.

which engaged him not to have immediate recourse to the trepan; and, what still more strongly determined him to suspend this operation was, that the pieces of the fractured bones, being, as we have said, divided from each other, he imagined that each fracture might permit the blood, that should happen to be extravasated on the *dura mater*, to be collected in the tumors form'd at the lower end of these fractures, and that the opening of these tumors might be sufficient to procure a discharge of this extravasated blood. He contented himself therefore with gradually depressing the pieces of bones which had risen above their natural surface, and keeping them in this situation by the *capeline*; which is a bandage proper for the purpose*. The patient was hardly at all disorder'd during the whole cure, which was finished in three weeks.

This observation shews, that skilful practitioners are not always obliged to follow, servilely, even the most invariable rules of art; but, as we have already said, they are not to be departed from without a great deal of judgment and sagacity; for a surgeon could not justifi-

We may in certain cases recede from the most invariable rules of art, but this ought to be done with judgment and circumspection.

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* See it described in Heister's surgery.

fy himself, by such examples, if the patient, whom he did not think proper to trepan in a fracture of the *cranium*, should happen to die; because in such cases, the safety of the patient requires that recourse be had to this operation, unless the fracture itself visibly answers the end of the trepan, by an opening large enough to extract or raise depressed or displaced fragments, or to furnish a passage to the extravasated blood, whether there be a piece of bone removed, or whether there be a division, which may certainly allow the extravasated blood to flow out: And there are even cases thus circumstanced, in which we may be easily deceived. For the separation may, indeed, be sufficient to procure a discharge of the blood extravasated on the *dura mater*; but sometimes the extravasation is under that membrane, and the aperture form'd by this separation is not always considerable enough to enable us to discover such an extravasation soon enough by the state of the *dura mater*, in which case we should only be apprised of it by symptoms, which frequently appear too late.

A young lad, apprentice to a carpenter, fell from the second story of a house to the ground, with a joist or rafter in his hands. He did not lose his senses, but immediately vomited, and bled at the nose and ears. Next day he was carried to the *Hotel Dieu*: M. Boudu examined a contusion he had in his head, and perceived an unevenness, which made him suspect that the *cranium* was fractured. He made a crucial incision on the middle part of the right parietal bone, and found two fractures which crossed that bone obliquely. One of them suffered the blood, extravasated on the *dura mater*, to run out copiously thro' a small opening, or fissure, formed by the separation of the pieces of the fractured bone, tho' there was no fragment depressed.

VI. Observation
by M. Boudu, on
a fracture of the
cranium.

It was thought this fracture might answer the end of the trepan, by giving vent to the extravasated blood. M. *Bondu* order'd him to be blooded, which was the fifth time, for he had been bled four times the day before. The same evening a vomiting succeeded, and next day bleeding was repeated. The patient had no fever or other symptom for three days, but on the fourth, which was the seventh of his disorder, he was seized with a fever, and vomited a bilious matter; and the two following days he was blooded four times, and the fever abated.

On the tenth day he was pretty easy, but afterwards complain'd of a violent head-ach, and fell into a profound sleep, which, however, was much disturbed, and he had also some irregular shiverings. All these symptoms made it suspected that there was an extravasation under the *dura mater*, which must be evacuated. On the fourteenth day of the disorder two trepans were applied, and an incision made in the *dura mater*, which gave vent to a spoonful of blood extravasated under that membrane, and which consequently could not be discharged by the fracture. After the operation, the patient was blooded four times in the arm, and once in the foot. He continued restless and delirious, and felt a sharp pain in the right *hypochondrium*; a considerable fever came on, and was succeeded by irregular shiverings, which made a suppuration of the liver suspected. At last he was seiz'd with a lethargic sleep, and died the seventeenth day after his fall.

Upon opening the part, the *pericranium* was found to be inflam'd and livid near the wound. The fracture of the *cranium* was composed of various fissures, the largest of which extended obliquely, from the inferior and posterior part of the right parietal bone, as far as the sagittal future, where it formed a sort of V, and reach'd from thence as far as the pos-

posterior part of the left parietal bone. The *dura mater* was in a manner callous and thick opposite to where the trepans were placed, and fungous opposite to the fissures or clefts of the fracture. The *pia mater* appear'd somewhat inflam'd, but the brain was in its natural state: And on examining the *abdomen*, an abscess was also found in the great lobe of the liver.

The separation of the futures may, as well as that of fractures, facilitate the discharge of blood extravasated under the *cranium*; but this case deserves particular attention, for the extravasation may be made on both sides of the future, and then the evacuation cannot generally be made but on one of the sides, because the *dura mater* may still remain adherent towards the edge of one of the divided bones, and retain the blood extravasated under that bone.

Separation of the futures may prevent the necessity of the trepan.

M. *Mouton* informs us, that he was call'd to a man on the eleventh day after he had had a fall. The patient had lost his senses, and was at death's door. He examin'd his head, and only found a small longitudinal tumor or elevation, the whole length of the sagittal future, where he made an incision about three fingers-breadths, which discover'd a separation or division of the future. By means thereof a part of the blood, extravasated under the *dura mater*, was discharg'd, in the night time, thro' the separation of the future; notwithstanding which a fever and delirium succeeded next day. The trepan appear'd absolutely necessary, and was accordingly applied on both sides of the future. The blood had indeed flow'd from the left side, but a large quantity was found under the right parietal bone, which was evacuated by this means, in consequence of which the symptoms immediately abated.

VII. Observation by M. *Mouton*, on a separation of the sagittal future.

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It is exceeding probable, that the *dura mater*, which always adheres strongly near the futures, stuck to the bone on the right side, and hinder'd the discharge of the blood. For this reason, exclusively of symptoms, we ought to be very attentive to this circumstance, for *Marchelis* speaks of a like separation of the lambdoid future, which, tho' considerable, could not procure a discharge of an extravasation on the *dura mater*, which prov'd mortal to the patient.

A surgeon may, in most cases, easily determine what is to be done in wounds of the head, attended with either fracture, depression, or manifest contusion of the *cranium*. But there are more perplexing cases, in which even the greatest masters of the art are at a loss. Such are blows on the head without any sensible hurt of the bone, and often without any wound or manifest contusion of the flesh. Sometimes these blows produce extravasations under the *cranium*, and at others occasion none, tho' accompanied with circumstances or symptoms which give room for suspecting them. The adherence of the *pericranium*, in blows of the head, is by some look'd upon as a certain sign, that there is no fracture of the *cranium*, nor any indications for the trepan. On the contrary it is judged that when this membrane is separated from it, there is always a fracture or contusion, and consequently a necessity for trepanning.

They are often determined to have recourse to this operation, by conjectures drawn from the violence of the blow, by whatever instrument occasion'd. Again, if the symptoms, accompanying wounds of the head without fractures, be violent, this determines many surgeons to trepan; whereas others content themselves with attacking the symptoms by bleeding, and such other remedies as tend to remove them. Both parties often succeed, but both also are often deceiv'd. We shall therefore

fore endeavour to discover, even in their different success, the circumstances or particulars, which may assist us in distinguishing those cases, where we may determine, with the greatest certainty, what measures are to be taken.

A man fell from an eminence of fifteen or sixteen feet high, with such force on his head, that his right eye came out of its orbit, and hung on his cheek. He was so stunn'd by the fall, that he instantly lost his senses, and continued, as it were, in a profound lethargy. A considerable contusion was found on the right parietal bone, the clavicle of the same side was fractur'd, and the eye replaced itself soon after the fall. *M. Gallait* examined the wounded part; and it did not appear that there was any extravasation under the *cranium*, nor that the flesh was separated from the bone, which inclined him to think there was no fracture. He had a mind, however, to lay the bone bare, in order to be more certain of it; but as the lethargy appear'd to him to be produced by nothing more than the commotion of the brain, and that in this case, the trepan would be useless, he placed all his hopes in bleeding, and accordingly the patient was blooded fifteen times in forty-eight hours; and the first nine times the operation was perform'd every two hours. The patient's senses did not return till the ninth day, and in a month's time the cure was compleated.

This observation seasonably brings to our remembrance a curious remark of *M. Petit*, on the loss of the senses and a lethargy, which deserves to be very attentively considered. This skilful practitioner is of opinion, that these symptoms are only the effects of a commotion of the brain, when they happen the moment the hurt is receiv'd, and that when they appear afterwards, they are caused on the

VIII. Observation
by *M. Gallait*, on
a blow of the head,
with a loss of me-
mory, cur'd with-
out the trepan.

Remark on the
loss of the senses,
which happens im-
mediately on a
blow.

con-

contrary by an extravasation afterwards made under the *cranium*. We shall not enlarge on this remark, since the reason of it is easily comprehended, and it is, besides, fully explain'd in a treatise of operations, which M. *Petit* intends to publish, and we hope will appear very soon. We think it sufficient to bring some farther examples here, which prove that the loss of the senses, which happens immediately upon receiving the hurt, is not sufficient to determine us to apply the trepan, when there is no fracture of the *cranium*; but that, nevertheless, we are to consider that the loss of the senses, caused by a commotion of the brain, may be follow'd by another, which depends on an extravasation, and that both may sometimes be confounded together.

Some authors appear to have hinted at the same thing, but none of them has treated so clearly of it as M. *Petit*, in his demonstrations at St *Come*.

A man, of about twenty-five years of age, fell upon his head from an eminence eight or ten feet high, and receiv'd a small wound on the left lateral part of the coronal. He lost his senses immediately upon the fall, and remain'd in a kind of lethargy, accompanied with a privation of almost all sensation. M. *Boudou* examining the wound, perceived that the *pericranium* was bruised, and dilated it, and laid the bone bare, in which he found no fracture. The patient was blooded thrice in the arm the first day, as often the next, and on the third he was blooded in the foot; but, notwithstanding these bleedings, this accident and the lethargy continued. He made very little water, and had no stools. Two purgative clysters were injected, which produced no effect. Next day six grains of some emetic were given him at two doses, and the following day a clyster made with an ounce of tobacco was injected, but all these remedies did not abate the symptoms. The patient remain'd in the same

IX. Observation, by M. *Boudou*, on a blow on the head, with the loss of the senses.

state till the eighth day, when he began to give proofs of the return of his senses in some degree; for he understood what was said, open'd his eyes, and even answer'd when a person spoke very loud to him, and teiz'd him. But his answers were incoherent, and the faint appearances of thought and knowledge disappear'd as soon as he was left at rest. The same evening he relaps'd into his former lethargic state; which was a perplexing circumstance, and seem'd to be a certain sign of an extravasation or inflammation, or perhaps a suppuration under the *cranium*. Nevertheless, M. Boudou, tho' encourag'd by these almost decisive conjectures, would not venture upon the trepan, which succeeds ill in hospitals, by reason of the bad air. For this reason he had recourse again to purgative clysters and the emetic, but these remedies availed not at all; yet, persisting in the same indication, he prescrib'd a clyster of tobacco, together with a purgative potion prepar'd with cassia, which gave the patient several stools. At last he order'd him to be bled twice in the jugular, the last of which bleedings was perform'd on the eighteenth day of the disorder. Then, whether his lethargy was the consequence of a commotion of the brain, or whether it was caused by an extravasation of blood, which had been absorb'd, this symptom began to disappear, the pulse began to discover itself, the respiration became more free, his understanding and senses return'd, and in a little time the wound was quite healed. The only bad accidents which remained were deafness, and a total loss of memory. But these symptoms began to abate considerably, at the time that this observation was communicated to us.

Commotion and extravasation may, as we have said, both together contribute to the loss of the senses, and the lethargy, when these symptoms continue several days.

Loss of consciousness by extravasation confounded with that from commotion.

days. This case is very difficult to be distinguished from that in which these very symptoms depend on commotion alone. *M. Boudou's* observation, just related, seems to increase the difficulty, by rendering dubious a sign, which should seem to denote the difference between these two cases with sufficient certainty. For if the lethargy yields, at least in some measure, to the bleedings and other remedies, and afterwards returns, ought we not to conclude that the first was caused by commotion, and the second by the extravasation gradually made since the blow; and in this view ought we not to have recourse to the trepan? We see, however, by the preceding observation, that the second lethargy was removed by repeating the bleedings and other evacuations used at first; which seems to ascertain that there was no extravasation. But such success is not very ordinary, and the indication for the trepan is in such cases too well founded to be rejected, unless we have particular reasons to determine us to take another method; for it is the most certain and common practice, and the best establish'd by experience. We proceed to give a remarkable example of it, for the sake of young practitioners.

A mantle-piece of a chimney, by falling all at once, struck a child, of four years and an half old, on the superior part of the right parietal bone, with one of its corners, and caused a contusion as large as a pullet's egg. The child lost its senses the instant it receiv'd the hurt, and bled at the mouth.

Loss of the senses which indicates the trepan.

M. Dru found it without motion, sensation, pulse, or any perceptible respiration. He gave him a spoonful of strong baum-water, by which means the child vomited up the blood he had swallowed. Then he bled the child; the blood at first flowed in a stream, but afterwards flow'd only drop by drop.

X. Observation, by *M. Dru*, on a wound of the head, in which the sagittal suture was taken for a fracture.

The senses return'd a little at the end of two hours, and the pulse grew stronger by slow degrees ; and then some broth was given him, which he vomited up with some chylous matters. M. *Dru* suspected a fracture of the *cranium*. M. *Guiard* a physician, and M. *Picard* a surgeon, who were call'd in at the same time, agreed with him that there was a necessity of discovering the bone. Accordingly he first made an incision upon the tumor, parallel to the sagittal future, and a second, which, with the first, form'd a T. He rais'd the two angles of the wound, and perceiv'd that the contused flesh was separated from the *pericranium*, which adher'd to the *cranium*, and had preserv'd its natural colour. He judg'd it expedient not to separate it, or at least to wait till next day, in order to judge better of the necessity or inutility of laying the bone bare. The child recover'd its senses perfectly, immediately after the incision, and took some broth easily, but soon after vomited it up.

Next day M. *Dru* found him with a fever, and convulsive motions of the lower jaw. These symptoms inclin'd him to apply the trepan; but the child's father begg'd of him to call in some other surgeons to consult with, and four were accordingly sent for. After the dressing was removed, M. *Pineau* examined the wound, and not finding the bone laid bare, was surpris'd that the *pericranium* was not separated, because he judg'd of the necessity of doing it, by the then state of the patient. The incision was made from the side of the future, in order to render it crucial, and by that means lay the bone more effectually bare, and the *pericranium* was separated ; but the blood that was thereby discharg'd, and the form of the sagittal future, which was uneven, made them take that future for a fracture. The application of the trepan was put off till next day, in order the better to discover the state of the frac-

fracture, and the patient was blooded for the third time. Next day it appear'd that what had been taken for a fracture, was part of the sagittal future, which, instead of continuing its road strait, ran off to the right side, and which likewise, instead of being indented in that part, was on the contrary scaly, so that the left parietal ran over the right about two lines. When they had perceived this kind of fault in the make of the sagittal future, and were undeceived with respect to the supposed fracture, it was judged proper to lay aside the trepan.

Next day, which was the fourth of the disorder, messieurs *Guiard*, the father and son, physicians, and messieurs *Dru* and *Picard*, surgeons, found the patient in a comatous disorder, accompanied with a fever and convulsive motions, which determin'd them to the operation of the trepan, which M. *Dru* immediately perform'd; and about a tea-spoonful of blood, half coagulated, and of a very brown colour, was discharged directly from the opening made thereby. By the part where the *dura mater* adher'd to the sagittal future, a judgment was form'd how far the scaly part of the left parietal ran upon the right. In the evening the patient was blooded for the fourth time, and all the symptoms disappear'd, and he had a good night. Next day half a spoonful of blood, of the same colour and consistence with the former, came from the opening of the *cranium*; and about as much was discharged the same evening. On the sixth and seventh days the matter discharged was mix'd, but afterwards only a laudable pus was evacuated, and the cure was happily compleated.

The indication for the trepan, tho' taken simply from the symptoms, was decisive in this wound, because the loss of the senses, which happen'd by the commotion, and that afterwards produced by the

extravasation, appear'd separately. But sometimes the loss of the senses, produced by extravasation, happens before that occasion'd by commotion begins to disappear; in which case they are both so confounded together that we cannot distinguish them, and we may then conclude that it is always the loss of the senses produced by commotion, which continues, because sometimes it does in reality last a long time. In this confusion, the indication for the trepan is very hard to discover, when there is no fracture, and the loss of the senses is succeeded by no symptoms which can make us suspect an extravasation. We shall give an example of these two kinds of the loss of the senses, confounded together, and which were only discover'd because the surgeon was determin'd, by a fracture, to trepan the patient.

XI. Observation by M. Pineau, on a fracture of the cranium, in which there instantly happen'd a loss of the senses.

In the month of June, 1725, M. Pineau was called to see a boy of twelve years of age, whom he found deprived of his senses, and labouring under a bilious vomiting, and an involuntary discharge of his excrements and urine. A horse had just struck him on the right side of his forehead, which had depressed the two tables of the coronal bone in its inferior part, about two fingers-breadths above the superciliary sinus. The blow fell'd him to the ground as dead. M. Pineau order'd him to be blooded, and propos'd the trepan. But a quack having told the parents that their child could not survive the wound, and that it was to no purpose to trepan him, they left him for eight days and more in the same state, without suffering any other dressing to be applied than such as is used in a simple wound. At last, however, they left him to the care of M. Pineau, who made an incision, and discover'd a fracture, which was a depression of the two tables of the coronal

ronal bone, as large as a crown-piece. And next day he applied the trepan, and with the terebra extracted the portion of the depressed bone, and about half a pint of blood was discharged from the opening of the *cranium*. M. Pineau dressed the wound with a tent dipt in honey of roses and spirit of wine, covering it with pledgets of dry lint, and compresses dipt in wine. About an hour after the operation the boy's senses return'd, and the symptoms ceased. On the seventh day after the operation, somebody unadvisedly permitted him to eat some solid food, upon which succeeded a remitting fever, and a pain in the right *hypochondrium*. M. Pineau order'd him to be blooded twice, and prescrib'd cooling clysters to be frequently injected. The fever ceased, and the pain of the side was greatly abated in eight hours time. But the patient swell'd suddenly, from the crown of his head to the sole of his foot. Upon which he order'd him to drink an aperient ptisane, and purg'd him every three days with manna and epsom salts. This swelling lasted a month, but the pain was not entirely remov'd in less than three months, in which time the cure was finish'd*. M. Garengeot has communicated a very remarkable observation on the same subject.

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* We may, perhaps, attribute the loss of the senses, which happen'd immediately upon receiving the blow, rather to the depression of the fracture, than to the commotion of the brain. But depressions, which, like this, are not opposite to some sinus which they may compress, do not always throw the patient into a lethargy. The blow was violent enough to cause a commotion capable of producing this loss of the senses, which happen'd so suddenly, that the patient dropt down as dead the moment he received it. Thus there is great reason to believe that the commotion was at first the chief cause of this accident. It is also certain, that so considerable an extravasation, as was found in the present case, was a cause sufficient to re-produce the same symptom, and maintain it in its first state. M. le Dran, in the first volume of his observations, gives us the history of a blow on the head, in which we see, with great certainty, that there was at first a loss of the senses, produced by the commotion, and afterwards a lethargy, occasioned by an extravasation, which were so confounded, that, from the very moment of receiving of the wound, they seem'd only to form one single symptom.

XII. Observation, by M. Garengeot, on a blow of the fist on the head, which was succeeded by an extravasation and death.

He was desired to open the body of a woman, who had receiv'd a blow of the fist upon the temporal muscle, which was immediately succeeded by a lethargy, in which state the patient lived seven days. He carefully examin'd the bone, and all the parts which cover'd it in the place where the blow was given, and found nothing but a little extravasated blood in the body of the muscle, which had insinuated itself between the fibres, but he found a considerable extravasation on the *dura mater*. This may be look'd upon as an extraordinary accident; and yet the writers of observations, and, amongst the rest, *Hippocrates*, give us some cases not much unlike it.

In the case communicated by M. Pineau, the fracture hath happily furnish'd a compleat indication for the trepan; for the loss of the senses, which happen'd immediately after the blow, and continued in the same state, would not, without the fracture, have been a sign sufficient to indicate the trepan; for tho' we can give several instances of this sort of the loss of the senses, attended with an extravasation, yet we find, by a multitude of observations, that this symptom is then almost always caused by commotion, and we even observe that this cause alone does sometimes produce, along with the loss of the senses, other very violent symptoms, in which the trepan would then be of no service.

XIII. Observation, by M. Manteville, on a blow of the head, without fracture, succeeded by considerable symptoms, and cured without the trepan.

A lady, of about forty years of age, fell backwards from the top of the stairs to the bottom. She was found without pulse, and senseless, and afterwards vomited a great deal of blood. M. Manteville examin'd her head, and only found a little redness on the hinder

der and lower part of the right parietal, to which he applied compresses dipt in *aqua vitæ*, and blooded her several times. On the fifth day she had some uneasy motions, accompanied with interrupted groans, but still continued senseless. Messieurs *Arnauld*, *Malavil*, and *Guerin*, the father, being call'd next day, found her in violent convulsive fits, and delirious: This induced them to repeat the bleeding, notwithstanding which the symptoms increased. Upon this, M. *Arnauld* proposed the trepan, but the other surgeons were only for making an incision, to examine the state of the *cranium*, before resolving upon the operation. The *pericranium* adher'd to the bone, whence they presum'd that there was no extravasation on the brain, nor a fracture of the *cranium*. In reality they found no contusion or other hurt of the *cranium*, at least externally; for which reason they contented themselves with dressing the wound the common way, and having recourse again to bleeding, so that in nine days they took away about forty porringers of blood, and her senses return'd by degrees; but she was two years in recovering her health.

Tho' such considerable symptoms, succeeding the loss of the senses, which appear'd the moment the blow was receiv'd, were removed without the assistance of the trepan; yet, setting aside, for a while, the conjectures which may be drawn from the adherence of the *pericra-*

A loss of the senses happening at first, to which inconsiderable symptoms supervene, may furnish an indication for the trepan,

nium, 'tis our opinion that recourse ought to be had to the trepan in the like cases. For such an increase of symptoms denotes likewise an increase of cause, and this last is almost always an extravasation under the *cranium*, or in the internal part of the brain. The first is most frequent, and may be remedied by the trepan, and cannot be remedied surely but by this operation. These considerations are sufficient,
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it should seem, to determine us to the trepan, when considerable symptoms succeed a loss of the senses happening immediately after the blow. For we ought to reason in these cases, as in all those in which the extravasation does not otherwise manifest itself, than by symptoms which do not denote whether it is under or above the membranes of the brain, or in the internal part of that organ, and in which, however, the most experienced surgeons always determine for the trepan.

M. le Dran, in his observations, speaks of a wound of the head, in which the *pericranium* was found entirely adherent to the *cranium*, as in the preceding case. The patient was only a little stunn'd when he receiv'd the blow, but sometime after lost his senses, and was seiz'd with convulsive motions. These symptoms still persisting, notwithstanding the bleedings, there was a consultation of surgeons, wherein it was determin'd to have recourse to the operation of the trepan, which, however, was perform'd in vain. The *cranium* was found, and no extravasation found in the *dura mater*. The symptoms depended on a violent commotion of the brain, which prov'd mortal on the eighth day. Upon opening the head, no blood was found extravasated on the *dura mater*, but there was extravasated blood in several of the internal parts of the brain.

We have seen, in the ninth observation, that the adherence of the *pericranium* ought not to be look'd upon as a certain sign, that there is no extravasation upon the *dura mater*: Neither is it a sign of the soundness of the *cranium*. M. Sarrau saw a wound of the head with a fracture of the *cranium*, in which the *pericranium* adher'd so strongly, even in the fractur'd part, that it was difficult

Adherence of the *pericranium* not a sign of the soundness of the *cranium*.

XIV. Observation by M. Sarrau, on a fracture with adherence of the *pericranium*.

ficult to separate it. The adherence of the *pericranium* then is not a circumstance sufficient to determine us, with certainty, to reject the trepan as useless in wounds of the head.

Neither is the detachment of the *pericranium* a sign to be depended on, either to induce us to suspect a fracture, or considerable enough to determine us to the trepan; for many observations evince, that this part is very often separated, and yet the bone is not injur'd, and nothing dangerous happens to the patient: Of which we proceed to give some remarkable examples.

Detachment of the *pericranium* not a certain sign that the *cranium* is injured.

A boy, of about twelve years old, was struck by a horse on the coronal, just where the hair begins to grow, which made a wound almost from one temple to the other, and the bone was laid bare, the length of four finger-breadths, and the breadth of an inch. The *pericranium*, which was separated from the bone, continued attach'd to the teguments, which were much torn. M. Malaval applied them to the bone again, and fasten'd them by slips of plaister, and a thick compress, which raised the skin of the forehead, and secur'd all by a bandage made of a handkerchief folded in a triangular form. This dressing answer'd the end of a suture, the wound was cured in eight days time, and no bad symptoms succeeded. He did not judge the trepan necessary, because he was persuaded that the blow had only glanced upon the bone, without striking it violently; for he imagin'd, with reason, that if the horse had struck him full in the part, the bone could not have resisted the violence of the blow, but must have been fractur'd by it.

The following observation relates a kind of contusion, which frequently deceives young surgeons. The circumference which is solid, and generally a little swell'd, and the middle, which is soft, and forms

forms a kind of cavity in the flesh, perceptible by pressing the finger against it, makes them imagine that there is a depression of the *cranium*. But when this contusion is open'd, it is found to be blood, extravasated between the bone and the *pericranium*, which produces this false appearance of depression.

XV. Observation,
by M. Malaval,
on a contusion,
with blood extra-
vasated on the
parietal.

A boy was struck, with a stick, on the crown of the head, on the sagittal suture, which raised a swelling as large as a hen's egg. The wound was dressed fifteen days unsuccessfully with compresses dipt in *aqua vitæ* and the vulnerary water. And then M. Malaval was call'd, who concluded, from the hardness and fix'd circumference of this tumor, that the blood which form'd it was lodg'd under the *pericranium*. It was open'd, and the blood, tho' in some measure coagulated, stream'd out with force. The *cranium* was found bare the whole length of the tumor, and the *pericranium*, which was separated from it, was cut thro', with the teguments to which it closely adher'd. He applied them to the bone again, and retain'd them in their place by compresses dipt in *aqua vitæ*, which he secur'd by the *couvrechef* bandage. He blooded the patient, and let the dressing lie on three days; upon taking it off he found the wound was almost healed, and it was entirely cured in six or seven days time.

XVI. Observation,
by M. Malaval,
on the same sub-
ject.

M. Malaval speaks of a child, of five years of age, who fell upon his head, and made a contusion, as large as an egg, on the right parietal bone; which was dressed, and the child blooded by M. Ponce, who afterwards open'd the tumor in the presence of M. Malaval; it discharged some extravasated blood, which was lodg'd under the *pericranium*, and the bone was found bare the whole length of the swelling, as in the preceding observation.

vation. The wound was dressed in the same manner, and with the same success.

We shall here observe, that these three observations of M. *Malaval* may encourage those who in such cases hesitate to apply the pieces of separated flesh to the bone again, especially when they are contused; for we see in these cures, that this practice, so long authorised by the best surgeons, has succeeded perfectly well, though the wounds mentioned by M. *Malaval* were made by contusion.

Contused wounds
cured by consolidation.

M. *Malaval* relates another observation on the same subject, but more remarkable than the foregoing. A servant was wounded by a rough stone of twenty pound weight, which fell perpendicularly, from a second story, on the top of his head, and knock'd him down, and took away his senses. The surgeon, who first saw him, found a large contusion, which he immediately open'd; and finding the *pericranium* separated from the *cranium*, and reflecting that the blow was a very violent one, concluded it necessary to trepan him; which determin'd him to cut the angles of the wound. Next day M. *Malaval* was also called, and upon visiting the patient together, they found him easy, without a fever, and sensible. They perceiv'd neither fissure nor depression of the *cranium*, and as the trepan was indicated by no symptom, they judged it proper to suspend this operation. The patient was blooded six times in three days, and kept to an exact regimen, which, however, he did not observe long; for having found means to get to some apples, he eat at least a thousand from the eighth to the fortieth day of his disorder. But, notwithstanding this, no bad symptom succeeded. The cure took up about three months, by reason of the exfoliation of the uncovered bone, which retarded the healing of the wound.

XVII. Observation, by M. *Malaval*.

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Detachment of the
pericranium not
sufficient alone to
indicate the tre-
pan.

There are few surgeons but can give us several observations of wounds of the head, in which the bone has been laid bare without being fractured, and where the trepan has not been necessary. To say the truth, these cases are so common, that it may seem needless to have treated so largely of them. But as there are some eminent surgeons, who look upon the separation of the *pericranium* as an indication for the trepan, we judged it incumbent on us not to omit those we have related. And the instances we have given are more remarkable than an infinity of others, and better calculated to convince us that the separation of the *pericranium* is not singly sufficient to determine us to the operation of the trepan.

The force of the blow which made the wound, mention'd in the last observation, must needs render it more terrible. But because the stone made no resistance, but broke in pieces upon his head, without fracturing the external table of the *cranium*, it was therefore judged that it had not probably fractur'd the internal table; which was indeed to be fear'd, as we shall shew by the following observation.

XVIII. Observa-
tion, by M. Sou-
lier, on a fracture
of the second table,
succeeded by sym-
ptoms which in-
dicated the trepan.

A soldier was struck so violently with a stone, that it stunn'd him, and he dropt down, but soon came to himself again. It made two wounds, very much contused, and near to each other, on the parietal bone, to which they penetrated. M. Soulier made an incision which brought them into one, and order'd several bleedings, and an exact regimen. Next day, the patient walk'd in the hospital hall, and continu'd three days in this state; but on the fourth was obliged to keep his bed, and began to feel pains in all his limbs, and especially his legs, and was seiz'd with a fever.

Upon

Upon this M. *Soulier* consulted the physician of the hospital; and they examin'd the wounds a-new, and observing nothing suspicious, they had recourse again to bleeding, and dress'd them in the ordinary method. But afterwards the wounds became fetid, and the symptoms continuing, the patient became as it were paralytic in the right leg and arm, a delirium with shiverings succeeded, and on the eleventh day he died.

Upon opening the body before several physicians and surgeons, about a spoonful of pus was found upon the *dura mater*, which was livid, and under it another small abscess was discover'd, a part of the pus of which had insinuated itself between the *cerebellum** and the brain. Then the *cranium* was examin'd, and nothing appear'd externally; but internally, that is, in the second table, an angular fracture was found, which corresponded to the outward wound.

This observation is an example of a counter-blow of one table of the *cranium* on the other, which might serve to prove the reality of these sorts of fractures, which have been contested, if there were not a great many instances of them to be met with in antient and modern authors, and amongst the rest in *Valeriola* and *Arceus*. *Tulpius*† gives us an observation, where many fissures were found in the internal, without any in the external table of the *cranium*. The fracture, of which *Borelli*‡ speaks, is more extraordinary. This author informs us, that a man was kill'd by a musket charg'd with small shot, and that tho' no fracture could be found in the first table, yet a portion of the second was found lying upon the *dura mater*, and entirely detach'd from the first. *Parè*§ relates a case, which is no less astonishing: A soldier had

Examples of contrafractures.

* *La Faux* is the French word.

† Bonet, bibliot. chir. Tom. i. p. 2.

‡ Ibid. p. 79. § Lib. ix. cap. 8.

had a pistol fir'd at him, the ball of which hit his head-piece, but made only a slight dint therein. There was no wound to be seen in his head externally: He died six days afterwards, and being open'd, the external table was found entire, but the internal fractur'd in several pieces, which prick'd the membrane of the brain. We also find in authors abundance of fractures made by counter-blows from one part of the head to the opposite part of it; and, for the honour of the antients, we will quote the history given by *Amatus**, of a trepan applied to the part opposite to the wound, because the symptoms did not yield to that applied to the side on which the blow was given, and because the patient felt a violent pain in the opposite side. The second trepan was applied very seasonably, for it made way for the discharge of some pus which was lodged under the *cranium*.

This method was as successful as could be wish'd, and at that time very astonishing. *Fallopious* gives us a parallel instance: And *Valeriola* speaks of a counter-blow, succeeded on the twenty-third day by a gangrene, which occasion'd the discovering a fracture on the side opposite to the blow, when there was no appearance of any on the side on which the blow was given. *Bartholin*† informs us, that, in consequence of a wound of the head, he had seen an abscess form'd in the part opposite to the blow.

There are fractures by a counter-blow, not only in opposite parts of the head, but also from one bone to another contiguous bone, and from one part of a bone to the opposite part of the same bone. There are examples of this kind to be met with in authors, and, among others, in *Garengeot*§, who relates many cases of this nature. *M. Feste* has lately communicated one to us, which sufficiently evinces how attentive surgeons ought to be to these counter-blows.

A young

* Bonet. sepulch. Tom. iii. de Vulner. obs. v.

† Ibid.

§ Traite d'Operations.

A young man passing under a large ship on the stocks, was struck upon the head by a piece of wood of fifteen pounds weight, thrown from the highest part of the vessel. It fell perpendicularly on the upper part of the right parietal, and made a wound there. The patient dropt down, as if he were dead, and bled at the mouth, nose, and right ear: And remain'd not only speechless and senseless, but also fell into convulsion fits, which lasted for some time, and return'd every half hour. The surgeon who first dress'd him, in probing his wound, felt the sagittal future, which he took for a fracture. M. Feste, who saw the patient soon after, suspected this mistake, and, to satisfy himself entirely about it, made a crucial incision large enough to lay the bone bare, upon which he effectually discover'd that the future had been taken for a fracture. Finding neither fracture nor depression in the part where the blow was given, and duly attending to the symptoms, which were violent, and particularly to his bleeding at one ear only, and on the same side with the wound, he suspected that the force of the blow might reach the lower part of the parietal, and produce a fracture there. This well-founded suspicion determin'd him to make an incision in that part, where he found a fracture, which extended obliquely to the occipital, and another fissure, which went transversely towards the squamous future; which last fracture was wide enough to facilitate the discharge of the blood, extravasated in that part on the *dura mater*. M. Feste applied two crowns of the trepan to the sides of the oblique fracture, and pressed the *dura mater* lightly with the *meningo-phylax*, to promote the discharge of the extravasated blood, which issued plentifully from the two openings made by the trepan, and was wip'd away

XIX. Observation, by M. Feste, on a contrafissure of one part of a bone to another part of the same bone, cured by the trepan.

with a sponge. The convulsive motions, which had lasted till then, immediately ceased, the other symptoms also disappear'd, and the cure was happily terminated.

Those who deny counter-blows, refer these fractures to a double blow, which the patient has either receiv'd or given himself, by falling down upon some hard body. But there are so many observations, where we see clearly that this double blow could not possibly happen, that we can no longer doubt of the reality of counter-blows. It would, however, be absurd to deny that these fractures do often happen likewise by a double blow, and that we may even observe different sorts of them in the same place by different blows.

M. *Froumontin* being called to open a body, found
 XX. Observation, a large wound on the left parietal,
 by M. *Froumontin*, on a double whence the surgeon had taken a considerable piece of bone, in the middle
 fracture by a double of which was a kind of hole which
 blow. penetrated to the *diploe*. He also discover'd that
 the first fracture, which had detach'd the piece of
 bone, reach'd from one to the other parietal. The
 two fractures were made by different blows, and
 different kinds of instruments; the first by a sharp,
 and the second by a blunt or confusing one, thrown
 upon the head of the patient, already knock'd down
 by the first. This patient liv'd twenty nine days.

These observations ought to render us attentive to such fractures, whether they happen by a counter-blow or by a double blow; for when the symptoms seem to discover them, we ought to take the surest method, in respect of the trepan, as messieurs *Merry**, *La Motte*†, and *Le Dran*‡, have done in the like cases.

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* *Garengeot*; traite d'operations, tom. iii. page 122.

† *Obf.* tom. ii. p. 307.

‡ *Obf.* tom. ii. p. 296.

It is also to be observ'd that, exclusively of these latent fractures caused by a counter-blow, the symptoms which happen some time after receiving the wound, as those mention'd in the tenth observation, and those specified in the following, are always sufficient to determine us to have recourse to the trepan.

A young man, of fifteen or sixteen years of age, received a blow with a stick, on one of his parietal bones, and no bad symptoms succeeded it. M. *Marechal* contented himself with opening the teguments, and promoting their suppuration. The patient was blooded, and the wound was suffer'd to heal up after the suppuration, during which time he walk'd every day in the hospital-hall. When he was thought to be perfectly cured, and ready to quit the hospital, which was on the seventeenth day of the disorder, he was seiz'd with a shivering, for which he was blooded two or three times. The shivering, however, return'd, and was succeeded by a considerable fever, accompanied with an head-ach, for which he was blooded again, and order'd to take vulneraries, notwithstanding which he died on the twenty-second day. M. *Marechal*, upon opening his body, found a quantity of purulent matter, as large as a pea, on the *dura mater*, on which it seem'd to have made no impression: And he also affirms, that if such symptoms had appear'd at first, as had occasion'd the least suspicion of an extravasation, the patient's life might have been saved. He might reasonably make this acknowledgment, for when there are no symptoms in such cases, there are likewise no indications for the trepan. It is, however, probable, that if the operation had been perform'd, as soon as the symptoms that afterwards succeeded began to appear, the patient might have

XXI. Observation, by M. *Marechal*, on a blow without any lesion of the cranium, succeeded by consecutive symptoms which indicated the trepan.

been saved: For it must be particularly observ'd, that when the trepan comes to be indicated by subsequent symptoms, the success principally depends upon not delaying the operation.

XXII. Observation,
by M. *Marechal*,
on a blow of the
head, without le-
sion of the *cra-*
nium.

A young man receiv'd a blow, with a stick, on one of his parietals, which was by this means laid bare. The blow was immediately succeeded by symptoms, which made it reasonable enough to suspect an extravasation. M. *Marechal* propos'd the trepan, but, because the wound suppurated well, and the patient's senses return'd, the other surgeons that were consulted did not think the symptoms considerable enough to determine them to this operation. On the sixteenth day the patient had a fever fit, with a shivering, and the wound was dry, and then they agreed upon the necessity of the trepan. The *cranium* was no sooner open'd than a large quantity of pus was discharged, which luckily had made no impression on the *dura mater*, so that the operation was attended with the desired success.

This example ought to encourage surgeons, in such cases, always to have recourse to the trepan, tho' the symptoms which may indicate it should not happen till long after the person's receiving the wound. *Riedlinus** gives us the history of a patient who was trepan'd, with the same success, three months after the blow, where the blood, extravasated on the *dura mater*, had, in all that time, contracted no alteration. *Lambswerde*† trepan'd a person at the end of six weeks, with the like success. *Fabricius Hildanus*§ speaks of a trepan applied two months after the blow; when a large quantity of pus was discharged, and at last there appeared a considerable fungus, which greatly obstructed the cure; but it was compleated at last, notwithstanding

* Ephem. an. 1700.

† Obs. 48.

§ Cent. 9. obs. 3.

ing this and a great many other inconveniences. *Marchetis** succeeded at the end of three months. The observation of *Scultetus*† is still more remarkable; for tho' the operation was not perform'd till six months after the blow had been receiv'd, yet it succeeded extremely well.

These cases would be truly surprising, if the symptoms which indicate the trepan, and happen so late, depended upon an extravasation of blood under the *cranium*; but they are less astonishing when they depend on a suppuration; for we know that a suppuration may not happen, nor discover itself, till a long time after the receiving of the blow.

It is evident, from all these observations, that it is only the symptoms that can determine us to have recourse to the trepan, in blows of the head without any apparent hurt of the *cranium*. For the conjectures that may be drawn from the force of the blow, the situation of the wound, and the state of the *pericranium* ||, &c. cannot alone constitute a sufficient indication for this operation; and we should act wrong, in being influenced by such signs, not to trepan, if these wounds were immediately accompanied with considerable symptoms; such as the loss of the senses, which happens in consequence of the blow, and that

RESULT.

In blows without fracture, the symptoms may alone determine to the trepan, especially the subsequent symptoms.

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which

* Obs. 7.

† Arcen. obs. 13.

|| We have not yet spoken of the *ecchymoses* of the eyes, of the vomiting, and of the blood discharg'd from the nose, eyes, ears, and mouth, because the uncertainty of these signs has already been observ'd by most observers. Sometimes these symptoms appear in cases, where there is either a fracture or an extravasation, and at others in those where there is neither. They are even often accompanied, in these last cases, with the loss of the senses, and sometimes with convulsive motions, &c. *M. La Motte*, among others, relates several examples of these different cases, in his observations, page 242, 266, 274, 303, 333, 340, 346, 363, and 364.

Conjectures taken from vomiting and the discharge of blood from the nose, eyes, ears and mouth, do not indicate the trepan.

which happens immediately on receiving it* ; and is

* Surgeons are neither agreed among themselves, nor in their own minds, about the loss of the senses, which happens the moment the blow is received. This contradiction is very remarkable in the writers of observations. For instance, *Marchetis*, in his medico-chirurgical observations, page 12. blames his fellow-surgeons for not consenting to the operation of the trepan, which he proposed in a loss of the senses, which happen'd immediately on a blow on the head, and was succeeded by a suppuration under the *cranium*, which killed the patient.

“ A wooden window,” says he, “ of a considerable weight fell from a great height on the *bregma* of a young man, which was not by this means cut but greatly confus'd. In consequence of this, the patient fell to the ground, where he remain'd without sense and motion, and deprived of all his principal faculties for the space of an hour. A physician of great note, and a surgeon being called, the usual remedies were immediately applied, namely, the white of an egg, oil of roses, and the like. But I being called on the second day, judg'd that the operation of the trepan ought to be immediately perform'd, contrary to the sentiments of some surgeons, my seniors, and the patient's father. But being call'd in again after the twentieth day, with the consent of them all, I made a crucial incision, from which a large quantity of pus was discharged. An ounce of matter flow'd daily thro' the pores of the *cranium*; for which reason, when I had perforated it, a large quantity of pus flow'd from the opening every day, but the patient died on the sixtieth day. I mention this, that you may not fall into the like errors when you have such wounded persons to treat, as have symptoms denoting that the internal parts are injured.” *Marchetis* relates this fact as a kind of victory, which he obtain'd over his fellow-surgeons. Many animadversions might be made on this ostentatious boasting, which is but too common amongst the writers of observations, and is generally ill-founded. In the present case, for instance, it is only by the event that *Marchetis* supports himself. But a suppuration, which happens after a blow on the head, does not prove the immediate necessity of trepanning. A suppuration, especially of the purulent kind, is not always the consequence of an extravasation; for it is often no more than the effect of an inflammation occasioned by commotion; and in this case, the symptoms of the commotion, and even the loss of the senses, do not always happen the instant the blow is received; and sometimes not till a considerable time afterwards. *Marchetis* determin'd for the operation, the first day of the accident, from the symptoms, and these were now reduced to a loss of the senses, which happen'd immediately after the blow, and lasted but an hour. But some pages after, in *obs.* 15, he maintains, that the loss of the senses is not singly sufficient in such cases to induce us to trepan. “ In such wounds of the head,” says he, “ some things are to be observ'd; for if by any blow or fall the patient's senses are taken away, and he is deprived of sensation and motion, there is no danger, unless the other symptoms, enumerated by *Hippocrates*, succeed; and in this case we are to forbear all operations, such as incision, and the application of the trepan; for I have seen some whose heads were wounded by a blow or fall, accompanied only with this symptom, totally recover'd and cured next day.”

M. *La Motte* has some observations,* where we see, that, happily for the patient, he used the trepan in a loss of the senses which happen'd immediately on a blow; and in some cases, which were accompanied with vomiting, and a discharge of blood from the nose, ears, eyes, and mouth, and sometimes with convulsive motions. The same author relates other examples† of blows of the head, immediately succeeded by a loss of the senses, attended with the same symptoms, and of which the patients were perfectly cured without the trepan. These contradictory facts in which surgeons can

hardly

Observers often fail to mention the indications by which they ought to have regulated their conduct.

* Tom. ii. p. 301, 333, 340, 346.

† Ib. p. 242, 266, 274, 363, 364.

is accompanied with other symptoms ; such as convulsive motions, a palsy, a violent fever, and disorder'd pulse ; and especially if these symptoms should continue notwithstanding the repeated bleeding, and the other remedies which may be used to remove them. It is to be observ'd that the bleedings ought to be very copious, and perform'd as soon as possible, in order to prevent the extravasation ; for they cannot be of any great use when the extravasation is made, especially when it is considerable.

We ought to be very attentive to the symptoms which succeed the loss of the senses, that happens immediately on receiving the blow ; for, as we have observ'd, this often conceals an extravasation, and unless we never fail to trepan in this case, that is to say, to trepan for the most part in vain, we must be at a loss, when there is no other symptom but this, what method to take, with respect to the extravasation, which may attend, and occasion this loss of the senses. All our dependance in this last case is founded on the symptoms which such an extravasation will not fail to produce afterwards ; for then these symptoms instruct the surgeon, and induce him to perform an operation which may preserve the life of the patient. Thus, tho' the loss of the senses alone is no decisive argument for the trepan, yet the patient, in case there be extravasated blood, is not entirely exposed to the fatal consequences of such an extravasation, if the sur-

We ought to be very attentive to consecutive symptoms.

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geon

hardly tell what they ought to have done, till after the affair is over, and only from the event, do not each of them in particular determine any thing with respect to practice, and neither instruct the surgeons themselves, nor those that would follow them. The histories of those cures, where the surgeons seem to have proceeded only by chance (that is, when they say nothing of the indications which they ought to have taken, and regulated themselves by, in those cases which appear so much alike, and in which they had recourse to such opposite methods, and notwithstanding had the same success) are not practical observations, but mere histories of cures, such as those who only saw them might give, tho' they were neither physicians nor surgeons.

geon be attentive to the symptoms, and thoroughly knows what method is best to be taken. These conjectures ought to be still less minded in cases where there have been no original or primary symptoms, and very considerable ones happen afterwards, such as shiverings, a fever, a delirium, a fix'd and acute internal pain, a lethargy, and convulsive motions; for in this case the patient must die, if he be not trepan'd with the utmost expedition, and even before these symptoms denote extreme danger.

We do not, however, assert that these conjectures are quite useless, in determining us how to act in perplexing cases; they may, if they are favourable, contribute to encourage us when there are no terrible symptoms, or to assist us, if otherwise, in determining for the operation, especially in cases already attended with some symptoms which seem to indicate it. But we maintain that they ought not singly to be admitted for decisive signs, to trepan, or not to trepan; for we can determine nothing concerning the state of the *pericranium*, if, as we have observ'd, it may be detach'd and contused, and no bad symptoms succeed, and if it may continue to adhere to the *cranium*, and appear in its natural state, tho' there is a fracture or extravasation. Neither can we come to any determination concerning the instrument by which a wound is given; if a blow of the fist causes a mortal extravasation, and if the fall of a rough stone, of twenty pounds weight, perpendicularly from a great height, on the head, makes a large wound in it, without occasioning any bad symptoms, we should find the same uncertainty every where, if we were to enter into an examination of these conjectures.

Conjectures may assist us to determine in difficult cases.

We

We must not, however, forget to observe that it would be wrong to entertain the same notions of the conjectures, with respect to the trepan, derivable from gun-shot wounds of the head, as we do from those which may be drawn from the blows given by other instruments which act with less violence; for most of the eminent surgeons assert, that we ought always to trepan in gun-shot wounds of the head, even tho' the *cranium* is not fractured; and, indeed, experience seems intirely to confirm their opinion.

Wounds of the head, made by fire-arms, merit particular attention.

A foldier received a wound, by a musket-ball, on the right parietal bone: The blow neither threw him down, nor was succeeded by any symptom. M. *La Combe*, who inspected the wound, found the bone laid bare, but no way hurt, for which reason he did not think the trepan necessary. On the twentieth day he perceived that the bone became black, and look'd upon this change as a preparation for exfoliation. But on the thirty-fifth day he was surpris'd at what happen'd; for a piece of bone, of the whole thickness of the *cranium*, came away, and made way for the discharge of half a glass full of pretty laudable pus, which had been lodg'd between the *cranium* and *dura mater*. He treated the patient, as if he had been trepan'd. The *dura mater* was deterg'd in a few days, the opening of the *cranium* was quickly fill'd up, and the cure completed in two months. It seems difficult enough to comprehend how so large a quantity of pus could be generated, and lodg'd on the *dura mater*, without occasioning any symptoms during the whole course of the cure. This will, however, appear less surprising, if we attend to a vast number of examples, which shew that pus is often insensibly form'd on the *dura mater*, in wounds of the

XXIII. Observation, by M. *La Combe*, on a wound of the head by a musket ball, which render'd the trepan necessary.

the head, and that we are only apprised of it by the symptoms produced by this matter, which afterwards becomes acrimonious by its stay there, and irritates the *dura mater*. And 'tis reasonable to conclude, that these symptoms would not have failed to appear, if the kind of exfoliation which happen'd, had not procured the evacuation of the pus before a longer stay had render'd it noxious. We find in this observation, that tho' the blow caused no commotion, nor other remarkable symptom, yet the ball produced so violent a contusion in the *cranium*, that it intirely destroy'd that part of the bone against which it struck, and occasion'd a considerable suppuration. Hence we may conclude, that fire-arms act with such violence, as must needs render them very dreadful. For tho' they cause no fracture nor visible contusion in the *cranium*, and tho' no considerable symptom succeeds, yet even such as are made by balls that are almost spent, deserve particular attention, because they may produce fatal consequences.

XXIV. Observation, by M. *Martiniere*, on a gunshot wound, without hurt to the *cranium*.
 A lieutenant, of the regiment of *Hainault*, received a wound, by a ball that had almost lost its force, a little above the right frontal sinus. The surgeon, who first saw it, judg'd it proper to make a crucial incision to examine the bone, but found no fracture. The blow had somewhat stunn'd the patient, but bleeding remov'd this symptom, and of course he had nothing more in view than the cure of the wound. At three weeks end the patient fell into a lethargy, and his pulse became low and hard. M. *Petit* the son, and M. *Martiniere*, chief surgeons to the army, being sent for, found the patient past hopes of recovery. However, the trepan seem'd to be so strongly indicated, that they thought themselves obliged to have recourse to it. And this operation let out a-
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bundance of pus, which was lodg'd under the *cranium*, but being perform'd only in the last extremity, it was of no service to the patient. These examples sufficiently shew that gun-shot wounds ought not to be confounded with other wounds of the head, where the conjectures which may be drawn from the wounding instrument, and the apparent force of the blow, lead to no determination.

We must have a very different opinion of wounds of the head, made by cutting and pungent instruments; for these wounds may not only not occasion extravasations, when they don't injure the *cranium*, but even when these instruments

Lesions of the *cranium*, caused by cutting or pungent instruments, do not always indicate the trepan.

do make incisions or punctures therein; for which reason young surgeons ought carefully to distinguish these incisions from other wounds of the *cranium* by contusing instruments. But notwithstanding it sometimes happens, that cutting or pungent instruments not only make simple incisions or punctures, but also produce fractures or contusions, and even depressions of the *cranium*; so that the surgeon ought to examine diligently if the wounds which these instruments make in the *cranium*, are only simple incisions, or slight punctures, or if they are partly fractures or contusions, and partly incisions or punctures. A fracture may generally be distinguished from an incision, by inspecting the wounded part: But to judge of a contusion, it is good to know, if possible, what sort of edge or point the instrument has which made the wound; for when incisions or punctures of the *cranium* are made by blunt instruments, we are to look upon them as contusing at the same time, especially when they are very large; whereas, when they are light, and have a fine edge, or are very sharp-pointed, we may presume that the incisions or punctures are without contusion; or that, if there is any, it is a very slight one; and then

then they are not much to be apprehended. *Paré* did not hesitate, in a parallel case, to replace a portion of the bone, which was intirely separated from the *cranium*, by the stroke of a sabre, and which remained attached to the flesh, and this practical expedient succeeded perfectly well.

Lastly, we ought carefully to attend to a circumstance, which sometimes accompanies wounds of the head, which is, the sensation, as it were, of the sound of a crack'd vessel; which may be heard in some cases when the bone is struck, and which the patient likewise sometimes perceives upon receiving the blow. This circumstance, and the conjectures it affords, with respect to the *trepan*, are no contemptible ones, especially when the patient assures us, that this sound was very distinct and observable to him, and the blow likewise was a violent one; for in this case, if we find no external hurt of the *cranium*, there is reason to suspect its internal table is fractur'd. *M. La Motte*, in a like case, perform'd the operation*, and found a fracture in the internal table of the *cranium*, and a considerable extravasation on the *dura mater*.

The symptoms which happen long after the blow, are the most pressing for the *trepan*.

It would be wrong to make the same inferences from the symptoms which come on after the blow, as we do from most of the conjectures we have mention'd; for these symptoms generally indicate the *trepan* when they are considerable, and the later they happen after the blow the more urgent they are. And the like symptoms suffice, exclusively of these conjectures, whether good or bad, to determine a surgeon to *trepan*. These symptoms, indeed, sometimes depend on internal causes, which are mortal, and in which the *trepan* is of no effect: Such are, for instance, a gangrene, a suppuration, or an extra-

* *Obs. de chir. tom. ii. p. 303.*

extravasation in the brain. Yet under this uncertainty, we ought still to have recourse to this operation, as it is the only remedy we can try in such a case to save the patient; and our hope is the better founded, inasmuch as these causes are much oftener lodg'd between the *cranium* and the brain, than within that organ. Thus, tho', in a parallel case, the success is in some measure dubious, yet the indication is neither equivocal, nor the art less certain in its decisions, because, on such occasions, the surgeon manifestly determines to take the most likely method to succeed, and that which is best authorised by experience.

I can't conceive that, after entering into the particular circumstances of the different cases I have examin'd, it can be objected to me, that patients have been cured without the trepan, though their wounds have been succeeded by full as bad symptoms as those which have determin'd surgeons to trepan other patients, where the operation was absolutely necessary: For we ought to form the same judgment of the symptoms capable of determining us to trepan, as we do of fractures and depressions of the *cranium*, which determine the most skilful and experienced surgeons to perform this operation, tho' these accidents are not infallible signs of the indispensable necessity of applying the trepan, since we have a great many examples of fractures and depressions of the *cranium* cured without it. The precepts of the art are not shaken by some particular observations, if, upon comparing all the circumstances, it appears that they prescribe the surest and safest method.

But before determining to apply the trepan, even from the most considerable symptoms, it is of moment to be well assured, whether these do not depend on the state of the external

XXV. Observation,
by M. Manteville,
on a blow of the
head, succeeded by
terrible symptoms
which depended on
the *pericranium*.

wound,

wound, especially of the *pericranium*, which often happens. An example will be sufficient to evince the necessity and wisdom of this precaution: A man, of about sixty years of age, was thrown down in the street by a coach, and by this means received a contused wound, about two finger-breadths long, on the superior and lateral part of the fore-head near the coronal suture. On the seventh day he was seiz'd with a gentle head-ach, accompanied with a slight fever, which increased next day; and the flesh of the wound became pale. On the ninth day the patient was lethargic, the tenth began to rave, and a total delirium succeeded. M. *Manteville* bled him several times, to abate these symptoms. At last he resolved to relax the *pericranium*, by making an incision in it to the bone; imagining that the symptoms might depend on this part, which was irritated and inflam'd, and in reality the incision removed them. To the tension of the *pericranium* and these symptoms there sometimes succeeds an erysipelatous swelling of the whole head: In which case an experienced surgeon easily discovers the source of the disorder, and speedily relieves it by the same operation. But in most cases, we ought, first (as M. *Manteville* did) to try what effect repeated bleeding will have, which was almost the single refuge of the ancients in such cases. The operation here perform'd, to give the *pericranium* liberty, was little known before *Pigray*. *Parè** remov'd the like symptoms by taking twenty-seven porringers of blood from the patient, which is about nine bleedings, and it was thought a large quantity in his time.

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* Lib. ix. cap. 14.

C A S E II.

IT sometimes happens, after blows on the head, that there remains a fix'd pain in the wounded part after the cure, which, instead of abating, in time increases more and more, notwithstanding all the topics that can be applied, which hath often oblig'd the surgeon to make an incision to lay the bone bare. Some surgeons have chose to rasp the bone, others to wait for its exfoliation, and others have judg'd it expedient to proceed to the trepan; and we shall find, by the following observations, that these methods have succeeded differently, according to the several cases in which they were used.

Pains of the head
after a blow.

A girl, of ten or twelve years of age, received a blow upon her head, by the fall of a curtain-rod upon it, which, however, made no wound, and she was soon cured; except only that she had a fix'd pain, of little compass, on one of her parietal bones; which increased now and then so much as to produce a fever, which was abated by repeated bleedings, and other general remedies. But the pain continuing obstinate for some years, M. *Marechal* was called, and judged the trepan necessary. He laid that part of the bone bare, where the pain was felt, and applying the trepan found the sawdust of the bone dry, like that of a *cranium* which has been long buried. This operation succeeded so well, that the pain ceased intirely, and never returned. M. *Morel*, in the following observation, gives us two examples of the like success.

XXVI. Observation, by M. *Marechal*, on a long continued pain in the head, after a blow, cured by the trepan.

A certain lady received a blow, by a log of wood, upon the middle part of the left-parietal bone; which made

XXVII. Observation, by M. *Morel*, on the same subject.

no wound, nor visible contusion. She was blooded, and a slight tho' fix'd pain in the wounded part engaged her to apply various remedies, and repeat the bleedings several times, all which gave her no relief, but the pain increased more and more. Upon this M. *Morel* judged it proper to open the temporal artery, which reliev'd her for about a month, but the pain return'd. A sanious humour flow'd from the ear of the wounded side, and afterwards from the other ear; but these discharges did not diminish the pain, which became more violent, tho' they return'd periodically every month, for the space of a year, by turns affecting one ear and then the other.

The patient, tir'd of her pain, called a consultation, in which it was resolv'd to open the part where she felt the pain. The bone was found, which made it hop'd that the suppuration would contribute to cure the disorder; it lasted fifteen days, but without producing the expected effect. M. *Morel* imagined the trepan might be attended with better success, and was induced to think so, because, some years before, he had seen a servant maid who had received a blow on the head, which did not seem to require the trepan, tho' some symptoms, which continued and prov'd obstinate, determin'd the surgeon to have recourse to the operation, six months after she had receiv'd the blow; which was attended with such success, that M. *Morel*, taught by this example, propos'd the same operation for this lady, and perform'd it with the same success. Nothing was found under the *cranium*, nevertheless the pain went quite off.

M. *Vacher*, who was a witness of this cure, had recourse to the same remedy in a parallel case, but not with the same benefit, because the disorder, as we shall see, did not arise from the same cause.

XXIX. Observation, by M. *Vacher*, on a pain of the head, arising from an internal cause, in which the trepan was useless.

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The daughter of an innkeeper in *Besançon* was attack'd with a pain of the head, which at first was not violent, but increased so in two months time, that she was oblig'd to apply to a physician, who, for the first six years of her disorder, in vain exhausted all the resources of his art. At length M. *Vacher* being call'd, thought of arteriotomy, which did little service. The patient, upon this, applied to another surgeon, who by his promises had gain'd her confidence. He made a crucial incision upon the middle of the sagittal suture, and rasp'd the bone, without any regard to the future. But finding that the patient reap'd no benefit from this method, he cur'd the wound, and took his leave of her: Then the girl sent for another surgeon, who desired a consultation, and accordingly M. *Vacher*, and several physicians and surgeons were call'd. M. *Vacher* relying on the success of the trepan, in the preceding cases, propos'd that operation; and the rest agreed to his opinion. The operation was perform'd, and no extravasation was found on the *dura mater*, nor any change in that membrane, only it appear'd somewhat more tense than in its natural state, which induced M. *Vacher*, some days after the operation, which had given no relief, to make a small opening in it, which prov'd of no service as well as the trepan; for the pain not only continued, but by intervals became extremely violent. On the eighth day after the operation death put an end to it, after the patient had endur'd it eight years.

Cranium rasp'd up.
on a future without symptoms.

Upon opening the *cranium*, three fungous excrescences were found, the largest of which was as big as a pea. They arose from the cortical substance of the brain, and adher'd to the *dura mater*, which, in that part, was very thick; whilst, on the contrary, the bone opposite to them was no thicker than a piece of paper. The superior ventricles were full

of water, and the third was full of thick black blood. In the *plexus choroides* were found about twenty glands, of the figure and size of the seeds of broom; at last an ulcer was discover'd on the surface of the *cerebellum*, which penetrated three lines deep into its substance. It is sufficiently obvious, from this detail, that the trepan could do no service in this disorder, which, as it did not arise from an external cause, of course does not belong to our subject. The following observation brings us back to it, and evinces that there are fix'd pains, which, tho' they proceed from external causes, do not require the trepan.

XXXObservation,
by M. Gervais, on
a long pain after a
blow, cured by an
exfoliation of the
cranium.

A girl, of fourteen or fifteen years of age, fell backwards in coming down stairs, by which means she lost her senses, and bled at the nose. She had a violent head-ach, which lasted many days, and was blooded several times for it, both in the arm and foot. These bleedings reliev'd her much: But, notwithstanding, there remained a fix'd pain in the back of her head, which was tolerable for the first fifteen days, but afterwards increased considerably, and return'd at regular periods. When she rubb'd the back of her head a little, she fainted away; and, exclusively of this symptom, she had epileptic fits eight or ten times a day after her pain grew so violent. M. Gervais, upon examining the part where she felt the pain, observ'd a small blackish spot in the skin, on the middle and superior part of the occipital bone. The skin was softer in this than in the neighbouring parts, and even look'd as if it were bruised. He pressed the part pretty hard with his finger, upon which the patient fainted away; not imagining at first that this accident was occasion'd by the pressure, as soon as she came to herself he began to press the same part again, to try whether he could find any disorder of the bones,
upon

upon which she fainted away a second time. Then he began to suspect that he had occasioned this syncope, and for farther satisfaction pressed the same part a third and fourth time, and each time the same accident happen'd. All endeavours to cure this girl by applications were fruitless; so that at last it was determin'd, in a consultation, to lay the pained part bare. The *pericranium* was separated from the bone, and the bone carious. As the symptoms continued after laying the bone bare, M. *Gervais* hesitated about applying the trepan, but believ'd that he might omit it, upon a presumption that exfoliation would be sufficient. Accordingly, as soon as the piece of carious bone was exfoliated, all the symptoms ceased, and return'd no more. *Scultetus* * relates an almost similar cure: A boy, about seven years old, fell down and pitch'd upon his head, and made a contusion on the side of the *sinciput*, which was succeeded by pain and convulsions; which, he adds, were immediately abated by applying the skin of a lamb newly slay'd to the child's head. But the pain and convulsions return'd regularly every new moon, which oblig'd *Scultetus* to open the wounded part, four months after the fall, suspecting that some humour was lodg'd between the *pericranium* and the bone, which corroded these parts. He found the *cranium* black and rough; the carious part was rasp'd, after which it was cover'd with good flesh, and the child perfectly cured in a short time. *Forestus* † relates an observation of the same kind; tho' it was some years after a wound of the head, before it was thought expedient to lay the bone bare, in order to cure a violent and fix'd pain, which had continued from the time of the accident, and ceased upon this operation.

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* *Armament. chirurg. obs.* 16.† *Benet. biblioth. chir. observ. de Forestus, obs.* 79.

*Marchetis** speaks of a wound of the head, which, after being cured, was succeeded by epileptic fits, and afterwards cured by the trepan. We shall hereafter relate an observation of M. *Turfan*, junior, of an epileptic patient, who received a blow on the head, for which he was trepan'd. The patient had no fit of the epilepsy so long as his wound was open, but it return'd as soon as the wound was cured. There are abundance of observations, to be found in authors, relating to the success of this operation, in the epilepsy in general. But as we consider the trepan hereonly, with respect to wounds of the head, we shall take another opportunity of producing these observations. However, it may not be amiss to mention a fact, in respect of the trepan, which seems a little foreign to our subject, because it is not certain that the disorder was occasion'd by a blow on the head; but 'tis certain that a blow on the head may be attended with the same accidents.

A nun, of the *Hotel Dieu* of *Mantes*, was seiz'd with a violent pain in the top of her head, accompanied with a considerable fever, and other dangerous symptoms; whence a suppuration was suspected in the pained part. This suspicion, along with the dangerous state of the patient, made her surgeons undertake to trepan her; which preserv'd her life, by giving vent to a considerable abscess form'd under the *cranium*. I have been surgeon of the same hospital since, where I saw and examin'd this nun, and the surgeons who were present at the operation. When we come to treat of the multiplicity of trepans, we shall relate an observation of M. *Daviel* of a pain of the head, produced by a caries, which did not yield to the trepan, but only to an exfoliation which afterwards happened.

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* *Observ. medico-chirurg. obs. 7.*

We see, by these observations, that the same end has been attain'd by different methods; to which, however, we are not to have recourse without distinction; for they sufficiently evince, that the trepan ought not to be apply'd, except the bone is carious almost in its whole thickness, or there are any symptoms which make it probable that the cause of the disorder is under the *cranium*, like that *caries* mention'd by *Bartholin*, in the internal surface of the parietal bones; or, lastly, if, after having judg'd it proper to wait for exfoliation, this does not remove the symptoms. But when the pain is external, and increased by any pressure on the part, all our hopes are from exfoliation, especially, if, after having laid the bone bare, only a superficial caries appears. To be assur'd of this, we must have recourse to the *rugine*, the use of which, in such cases, may be attended with other advantages, such as greatly promoting the exfoliation, and removing the pain before that happens. But this last effect depends principally upon laying the whole surface of the carious bone quite bare, that the caries may communicate no further with any part of the *pericranium*.

RESULT.
The trepan is necessary when the cause of the pain is internal, but exfoliation is sufficient when it is external.

A Remark on the Utility of Observations.

WE shall take this opportunity, which the present subject affords us, of making an important remark on the utility of observations. The manifest contrarieties in those we have related, may suffice to shew how dangerous it is to regulate ourselves in practice by the observations of others, when we look on every single observation as a model, and only consider the success; conceive too highly of the reputation of their authors, and have not ourselves observ'd the singularities, variations, or

uncertainty perceivable in the exercise of the art ; or have not skill enough to discover the particular causes of all these varieties in the observations of others. Can a young surgeon, for instance, from the twelfth and twenty-first observations, determine himself, in a similar case, to trepan or not to trepan? They were attended, in the beginning, with symptoms which divided the physicians and surgeons. In the twelfth, we find, that those who proposed the trepan were in the wrong. In the twenty-first 'tis plain that those who advised it were right in their opinion. But in both cases, nothing but the event removed the uncertainty, with respect to the method to be taken. That which was chosen, cannot serve as an example, since the success was so different in these two cures. From the tenth and fourteenth observations it further appears, that there are cases wherein we should risque the patient's life for want of the trepan, if, on account of the adherence of the *pericranium*, we should ascribe the symptoms, as in the thirteenth observation, to a commotion of the brain, and for that reason think the trepan useless. The same danger might be apprehended, if a young surgeon should take the second for a guide, in such a separation of a future, as that related in the seventh. Would it not also be dangerous, if a surgeon were to be guided by the twenty-fifth, in cases resembling that mention'd in the twenty-ninth, since by so doing he would use the trepan very improperly? In a word, would it not be an egregious fault to follow the twenty-ninth, in cases like those related in the twenty-sixth and twenty-seventh observations, since we should lose the patient by neglecting to have recourse to the trepan? These examples are sufficient to demonstrate how important it is to caution young surgeons, not to attach themselves to particular observations, and espe-

especially not to look upon them as models proposed to them to form their practice by.

Yet we are thoroughly convinced, that nothing is more useful than observations to instruct young surgeons; for it is easily perceiv'd that the nicest and most difficult principles of the art are render'd obvious, and brought down to the level of the generality, by nothing but striking examples. We only assert that it is impossible to reap this advantage from single and detach'd observations: For these ought only to be look'd upon as the materials necessary to build firmly, or, in other words, to form a sure, exact, and easily comprehensible doctrine. Now it is evident, from the different examples we have related in the first article of this essay, that the collecting a great number of observations, comparing them together, and opposing them to each other, is the only way to prevent our being led into mistakes thereby; and when they contain opposite methods, which seem to contradict each other, and render us at a loss what choice to make, nothing but this can hinder our being imposed upon by specious cures, which favour false or hazardous methods of practice. By this procedure only, we are enabled to discover certain singularities in the most common and most erroneous observations, which may assist us in discovering or illustrating some truths of great importance, either to theory or practice: Again, by this cautious method, after making an accurate examination of such observations, as seem to relate to the same case, we may observe the particularities and circumstances, which enable us to discover certain essential differences between those observations, which will not let us draw the same consequences from them. Lastly, by this method, when different observations upon the same subject seem, by the contrariety of facts, to destroy each other, we are enabled to perceive, on the con-

trary, that these very observations serve as mutual correctives to each other, prescribe to each its just bounds, severally bring themselves to their intrinsic value, and are necessary to determine vague and disagreeing truths which lead to errors in practice.

But this task requires much application : For the facts which may tend to the improvement of our art, do not ordinarily clearly occur upon a superficial reading of observations, but escape even persons of no mean penetration. They very seldom strike us, and attract our attention, but when we are employ'd in illustrating some point of doctrine, with which they have some connexion, and which renders them interesting to us. On such occasions we are sometimes surpris'd to be conducted to some very useful piece of knowledge, by an assemblage or concurrence of various observations, which before seem'd to contain nothing remarkable. Thus, we ought to entertain very different notions of the utility of observations, from such as naturally occur to those who have not consider'd the subject sufficiently, that is, to those who never consult observations but in difficult cases. The advantage they expect to reap from observations is very small ; for we rarely find that such as give us the history of diseases they have treated, judiciously rise above the ordinary rules, and, to supply us with examples, furnish us with *masterly strokes*, which we may prudently imitate in some cases, where there are no precepts to direct us, and where genius must supply the defects of art. If the use of observations went no further, there would be very few worth printing. But, as we have remark'd, they are of much more extensive use, and we cannot have too many ; for we must often look over a great number to find the particular facts which will contribute to establish or illustrate some truth, or
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but to limit it on one side ; and in these researches, we (generally) find that the fund of observations we have at present, is far from being large enough to furnish us with the knowledge and experience deducible from such histories.

We must, therefore, make laborious enquiries, collect abundance of facts, and range them on that side which relates to the subject we intend to examine, in order to obtain some light, from their assemblage, to settle, not an entire cure, but a single point of practice. Now it is evident that this task exceeds the abilities of young surgeons, as it does of those who are only versed in the theory of this art, and also of those who are nothing more than practitioners. The former are not sufficiently skill'd in manual operations, and the power of the art, to perceive what changes and improvements may be made in it ; and the latter have not knowledge enough to penetrate into the mysteries of observation, and make new practical discoveries. It often happens that observations fail of instructing even those who communicate them ; for observers seldom view facts on the most instructive side : The violence of the disease, and the success of the cure, are generally the two objects which strike them most. The surgeon, however, has sometimes no great share in the most considerable cures ; and frequently contributes nothing more to them, than by acting according to the best known and most common precepts. An observer can have no other reason for flattering himself that the reputation of the cure will always be ascribed to him, but because the wonderful effects of nature, and of the art, are easily confounded with the procedure of the artist. Nothing but nature ought to speak in observations : But her language, even when it is faithfully represented, is mostly dark or dubious, and even frequently deceitful, and cannot be interpreted otherwise than by the
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concurrence of those lights which an extensive practice, join'd with a scientific theory, afford. Consequently none but such as are eminently skill'd in both, can distinguish reality from appearances in observations, point out the wrong steps which are authoris'd by an equivocal and transient success, and discover good practice, even in cases where it has not been attended with success.

It would, therefore, be a gross imposition on young surgeons, to give them particular observations for models to direct them, who stand in need of sure and accurate instructions to guide them in practice. The best and only method they can take is, to attach themselves to the established and experienced maxims and rules of such able surgeons, as know how to make observations subservient to the correcting false and injudicious precepts, to verify those which are yet dubious, to fix the bounds of those which are only establish'd in a vague and undetermined manner, and to enter, by examples, into the detail of particular cases, which cannot be reduced to the ordinary rules, and the extent of which we do not yet sufficiently know, so as to fix and reduce them to precepts.

From all these reasons, the reader will see that the intention of the academy, with respect to the use of the practical facts communicated by its members or correspondents, is not to be solely confin'd to the collecting these facts, and giving bare relations of observations*. She has a much more essential task in view, and more worthy of her labour; she looks upon most of the observations, with which she can enrich the art, only as remote means

* The academy thinks herself oblig'd to publish the collection of observations communicated to her, that the masters of the art, who shall attempt to decide or illustrate any point of theory or practice, may make use of them in their memoirs. This collection will consist of several volumes, besides those which will contain the memoirs; in which latter we shall only give such uncommon and singular cases, as may singly, without the concurrence of others, be of eminent and certain use.

means conducive to bring it to perfection. Neither can she answer her intended end of contributing thereto by all possible ways, otherwise than by making it her principal study, by the assistance of these facts, and of those which are to be met with in the writings of the antients and moderns, to determine dubious or unsettled points of practice; to detect the bad methods, introduced by prejudice, and favour'd by false appearances; and to discover and fix the genuine indications to be pursued in doubtful cases.

MEMOIR II. By M. PETIT, *the Son.*

ESSAY upon Extravasations, and particularly those of Blood.

THIS memoir shall consist of six parts. In the first I shall treat of extravasations in the *abdomen*. Those in the cavity of the breast, and under the *cranium*, with those extravasations which happen in the various external parts, shall be the subject of the three next. In the fifth I shall examine the different terminations of these extravasations: And in the sixth and last, I shall propose various experiments that may be made, in order to prove certain points which I have only advanced on the footing of analogy.

Plan of the author consists of six parts.

PART I.

Extravasations in the Abdomen.

I Shall begin this first part by a detail of some observations; after which I shall enquire how an extravasation in the *abdomen* is made, and specify the consequences which ought to be drawn from it; lastly, I shall establish such signs as may surely indicate an extravasation in the *abdomen*; and these three different points will make as many articles.

ARTICLE I.

Containing some Observations relating to this first Part, of Extravasations in the Abdomen.

FOR the following observation I am indebted to M. d'Argeat, whose skill, and attachment to truth, are universally acknowledged. A soldier, of

of the regiment of *Normandy*, about twenty-four years of age, had been wounded by the thrust of a sword, a little below the *cartilago ensiformis*, and below the cartilaginous edge of the spurious ribs on the right side. It was about six of the clock in the evening when this soldier was wounded, and he vomited a little after; but *M. d'Argeat*, then surgeon of the same regiment, was not called till next morning at seven of the clock. He found the patient labouring under a considerable fever, a difficult respiration, and a hardness and tension of the whole epigastric region, the rest of the *abdomen* appearing in its natural state.

I. Observation, by *M. d'Argeat*, on an aperture made in the hypogastric region, in order to procure the discharge of blood extravasated in the cavity of the *abdomen*.

The external wound was very small, since it was not, at most, above five lines in extent. *M. d'Argeat* pressed it in different parts, in order to see whether it would discharge any blood, five or six drops of which could only be obtain'd. He did not judge it expedient either to probe the wound, or to dilate it by making an incision. He only applied to it a compress dipt in vulnerary water, covered the whole *abdomen* with a thick compress, dipt in a decoction of worm-wood, camomile, and *St John's wort*, and order'd the same fomentation to be renew'd every four hours.

M. d'Argeat order'd his patient to be bled three times in one day, and made him take, in spoonfuls, a potion composed of half a dram of the confection of hyacinth, fifteen grains of crabs-eyes, as much prepar'd coral, one grain and an half of laudanum, and six drams of the syrup of violets, the whole dissolv'd in four ounces of the distill'd waters of succory and *carduus benedictus*. Tho' the patient had only vomited once after the reception of his wound, yet *M. d'Argeat* suspecting that the stomach was penetrated, order'd that he should

should have no aliments except two or three spoonfuls of broth every hour.

During the night, the patient slept at different intervals, and next morning, things remaining nearly in the same state, he was conducted to the hospital of *Besançon*. *M. d'Argeat* continued to visit him daily, with *M. Vacher*, surgeon-major of the hospital. These two gentlemen agreed that the patient should be dressed as in the evening before, that he should be bled thrice more, that the fomentation on his *abdomen* should be continued night and day, and that at night he should take a julep like that above described, which composed the patient, and procured him some hours of sound sleep.

On the third day his fever was much abated, the region of the liver and stomach was less tense, and the respiration more free. The patient was bled the seventh time, and as he had not had a stool since the reception of his wound, they order'd him a clyster, which produced the desired effect. In order to remove his costiveness, *M. d'Argeat* proposed to boil an ounce of senna, in three quarts of the decoction used for the fomentations on his *abdomen*. By this addition to the fomentations, the patient had a stool or two regularly every day; next night a julep was also ordered for him.

On the fourth day the patient found himself much relieved; the epigastric region had almost lost its tension, the fever was very much diminish'd, the respiration was much more easy, and the wound was reunited, so that they contented themselves with continuing the fomentations.

On the fifth and sixth days he continued in the same state, but being seiz'd with a looseness, and having been at stool seven or eight times in twenty-four hours, messieurs *Vacher* and *d'Argeat* agreed to take the senna from the decoction used for the *abdomen*. The looseness continu'd till the tenth day,
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and as it became troublesome, with an intention to moderate it, the patient was order'd to take a dose of the confection of hyacinth, by which, without any other remedy, it was stop'd.

On the ninth or tenth day it was perceived that, towards the hypogastric region, the *abdomen* was swell'd, not without pain. On the eleventh the swelling and pain of the hypogastrium became much more sensible, and, on account of this symptom, the tension and pain of the epigastric region were renew'd, and the fever, which, on the eighth and ninth, was almost totally extinguish'd, return'd with as much violence as on the first. The irritation being communicated to the bladder, the patient was seized with an excessive desire of making water, but could only discharge his urine drop by drop.

On the twelfth the *abdomen* was still more swelled and tense. Then M. d' Argeat, who had frequently observ'd similar symptoms, in wounded patients who had died of extravasations in the *abdomen*, suspected that this soldier was really in such a case. This suspicion engaged him to examine the *abdomen* carefully, on which he perceived a somewhat larger elevation on the right side. Besides, tho' the tension of the muscles did not permit him distinctly to feel the undulation or fluctuation, yet, by attentively handling the tumor of the *abdomen*, it appeared to contain a collection of matter. This symptom, obscure as it was, joined to the other circumstances, made M. d' Argeat suspect that there was an extravasation in the lower part of the *abdomen*.

Messieurs Vacher, d' Argeat, Bernier, and Morel, having met to deliberate on the method most proper to be taken, agreed to make an aperture in the tumified part of the *abdomen*, because they thought they perceived the collection of extravasated matter by the touch. M. Vacher perform'd the operation
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on the most prominent part, which was on the right side, between the anterior and superior spine of the *os ileon*, and the tuberosity of the pubes, an inch above the ringlet of the *musculus obliquus externus*, parallel to the *musculus rectus*, and about a finger-breadth from it.

The incision in the skin was about two inches long, but the aperture in the *peritonæum* was only sufficient to admit the point of the little-finger. As soon as the *peritonæum* was open'd, there issued at least three pints of a black and very fluid blood, which seemed diluted with some serum.

This wound was dressed with a tent of linen, about half an inch in circumference, introduced into the *abdomen* about two finger-breadths, leaving a pretty long end without, which was secured by pledgets, a plaister, compresses dipt in aromatic wine, and the bandage commonly used for the trunk of the body.

Next day there was discharged, from the aperture of the *peritonæum*, about a pint of blood, like that evacuated immediately upon the operation, and after this the symptoms began to diminish.

At the third dressing there came forth only a small quantity of blood mix'd with pus. Wine mix'd with honey was injected into the *abdomen*; but this injection, creating some pain to the patient, was left off in two or three days, and in its stead was used only a decoction of barley, with a little honey of roses dissolved in it. About the fourth or fifth day after the operation, there was a very copious suppuration, and as soon as this began to be diminish'd, the injections were given over. Soon after the patient slept well, was free from his fever, perceived no more pain, and by the care of M. *Vacher* was intirely cured in thirty-six days. The patient has since followed his business, and tho' M. *d'Argeat* shew'd me him two years after, yet I did

did not perceive any disposition to an hernia in the part where the incision had been made.

A soldier received a thrust of a sword a little above, and on the left side of the navel. He was at first seiz'd with a vomiting, to which succeeded a painful tension in all the lower part of the *abdomen*, especially near the wound, which was only two or three lines in length, and was dress'd simply with a compress dipt in aqua vitæ, and secur'd by the bandage for the trunk of the body. The patient was blooded in the arm, and remain'd without any other assistance till the sixth day, when he was brought to the hospital at *Spires*, which was established for those wounded at the siege of *Philipsburgh*, and of which I then had the care as surgeon major of the army.

II. Observation of the author, on the same subject.

The first time I visited this patient, I found his *abdomen* somewhat inflated, flaccid, and without pain, except in the part of the wound, where was still some slight pain on pressing somewhat hard upon it. There was about the wound a certain blackness, which might have been as readily taken for a gangrenous spot, as for a simple ecchymosis, especially considering the bad state of the patient, for he had a continual hiccup, vomited as soon as he took any thing, had a bilious flux, and for the most part discharg'd his excrements involuntarily. He was extremely weak and extenuated, and his pulse so little and concentrated, that it could hardly be felt.

Tho' so deplorable a state indicated a gangrenous inflammation of the *abdomen*, yet I chose rather to hope for the best, against all probability, than to abandon the patient to certain death. I acted therefore conformably to the only supposition according to which any hopes of his recovery could possibly be conceiv'd; for as I imagin'd that the gangrene was not as yet perhaps confirm'd, I did all I could

to stop its progress. Notwithstanding the extreme weakness of his pulse, I order'd frequent small venesections in the arm. I applied, over the whole *abdomen*, linen cloths, dipt in a warm decoction of emollient and resolvent herbs, to which I added a fourth part of *aqua vitæ*; and these fomentations were often renew'd. At the same time, with a view to comfort his stomach, moderate his looseness, and recruit his strength, I made him take a spoonful of a potion every hour, composed of a dram of the *theriaca*, half a dram of the confection of hyacinth, and fifteen drops of *lilium*, in four ounces of an infusion of the tops of wormwood. I forbade the vulnerary draught, and order'd that he should have no other nourishment than, every two hours, four spoonfuls of broth, with about the fourth part of the yolk of an egg diluted in it; and to appease his thirst, I permitted him now and then to take a mouthful of a gentle nitrated emulsion.

After the first four venesections, which were made in the same day, the patient, instead of being weakened, had his pulse raised, and the hiccup somewhat abated. His nauseas and vomitings return'd less frequently, and his stomach retain'd some aliments or medicines. Next day I order'd him to be bled three times more, and the same regimen to be observ'd, by which means he became a little better, and was able to take a larger quantity of liquor without vomiting it up; the hiccup, however, continued, as well as the looseness. On the eighth day he was bled three times more, and his pulse seem'd strong enough to render the continuance of the potion needless. I only ordered him in the morning and evening a dose of *diascordium*, to check his looseness, and added an half of camphorated *aqua vitæ* to the decoction of emollient and resolvent plants.

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From the eighth till the twelfth day, the patient remain'd in much the same state, and was blooded five or six times during that interval. From the twelfth to the fifteenth his *abdomen*, which was become a little less inflated and flaccid, seem'd to swell again, and on the sixteenth there appear'd, on the right side of the navel, a blackness like that which before appear'd about the wound, and which still subsisted.

This blackness, which I with still more reason, as I thought, consider'd as a sign of a gangrene, did not permit me to suspect that there was any other cause of the several symptoms which I perceiv'd. I look'd upon the patient as a man who had only a few hours to live, and for whom there remain'd no more to be done; notwithstanding which, he continued three days in the same state, during the whole of which time, he was thought so near death, that every body was surpris'd to find him every night and morning still alive. On the nineteenth from the reception of his wound, he order'd me to be called to his relief. He had labour'd under frequent inclinations to make water without effect. Instead of his former looseness, he had not been at stool for two days. The hiccup was continual, and the vomiting very frequent. His *abdomen* was much more elevated, tense and painful, especially about the hypogastric region, and he had a high fever.

As the retention of urine might possibly be a new cause of heightening the symptoms, I sounded the patient, who was by that means relieved, tho' there was but little urine in the bladder. These irritations of the bladder, join'd to the elevation of the *abdomen*, and the painful tension of the hypogastric region, began to make me suspect an extravasation in the lower belly. But imagining that this extravasation was the consequence of some a-

perture made by the gangrene of the intestine, I did not believe that the patient could live till next day; notwithstanding which, I found him still alive, but in a very deplorable state. He vomited without interruption, and discharg'd, as it were, by regurgitation, a bilious and stercoraceous substance. This circumstance remov'd the notion I had conceived of an aperture of some intestine, and convinced me that the extravasation was of another nature, and that the extravasated matter in the *pelvis*, compressing the neck of the bladder, and the intestinal duct, was the cause of the retention of urine and the vomiting the feces.

I knew that, in similar extravasations, an aperture of the *abdomen* had been successfully made by the advice of M. d'Argeat; and tho' the state of the patient gave me not the least glimpse of hopes, yet his condition appear'd so insupportable, that I readily yielded to his solicitations to attempt something for his relief.

I, therefore, made an incision in the *abdomen*, an inch above the anterior and superior spine of the *os ileum*, and parallel to the *musculus rectus*. I made this incision on the right side, because on it the hypogastrium appear'd more elevated than on the other. As soon as the *peritonæum* was open'd, there burst out more than two pints of blood, which was black, infected and diluted with serum. More would have been discharg'd, if I had not moderated its evacuation, for fear of too much weakening the patient. I put into the wound a small tent of linen, which did not so stop the aperture as to hinder the extravasated matter from being insensibly evacuated between one dressing and another. Immediately after the operation, the patient vomited no more, and was much less afflicted with the hiccup. But he did not enjoy this relief long, for the gangrene of the intestines, arriv'd at a great height, put an end

end to his life, twenty-four hours after the operation, and the twenty-first day after the reception of his wound.

Notwithstanding the great quantity of matter discharg'd immediately after the operation, and that afterwards evacuated so copiously as to wet several cloths, I found, upon opening the carcase, more than a pint of bloody matter, extravasated in the *abdomen*, but not dispersed thro' the depressions and foldings of the mesentery, intestines and other viscera; tho' 'tis generally, but falsely believ'd, that this must happen when there is any extravasation in the *abdomen*. The extravasated matter had but one center, and was included, as it were, in a particular lodging. The cavity of the *pelvis* was the bottom of this lodging, and higher up, the intestines, glu'd to each other, form'd a plate, which, adhering in all its circumference to the *peritonæum*, determin'd the center of the extravasation.

This center was unequally circumscrib'd, and this unequal circumscription, no doubt, depended on the irregularity with which the blood had spread itself after its extravasation. According as it had met with more or less resistance, it had insinuated itself more or less forward into some of the windings of the intestines, so that these windings form'd a kind of burrows, or sinuses, which were more or less deep, but all communicating with the common center, and discharging themselves into it; so that the aperture, we had made in the *abdomen*, was alone sufficient to evacuate the whole of the extravasated matter. The internal part of the cavity, which constituted the center of the extravasation, was cover'd with a lymphatic pellicule, closely adhering both to the *peritonæum* and to the intestines. This pellicule was sufficiently solid to form a kind of bag, about half a line thick, which might be separated without breaking, and had been able to retain the ex-

perture made by the gangrene of the intestine, I did not believe that the patient could live till next day; notwithstanding which, I found him still alive, but in a very deplorable state. He vomited without interruption, and discharg'd, as it were, by regurgitation, a bilious and stercoraceous substance. This circumstance remov'd the notion I had conceived of an aperture of some intestine, and convinced me that the extravasation was of another nature, and that the extravasated matter in the *pelvis*, compressing the neck of the bladder, and the intestinal duct, was the cause of the retention of urine and the vomiting the feces.

I knew that, in similar extravasations, an aperture of the *abdomen* had been successfully made by the advice of M. d'Argeat; and tho' the state of the patient gave me not the least glimpse of hopes, yet his condition appear'd so insupportable, that I readily yielded to his solicitations to attempt something for his relief.

I, therefore, made an incision in the *abdomen*, an inch above the anterior and superior spine of the *os ileum*, and parallel to the *musculus rectus*. I made this incision on the right side, because on it the hypogastrium appear'd more elevated than on the other. As soon as the *peritonæum* was open'd, there burst out more than two pints of blood, which was black, infected and diluted with serum. More would have been discharg'd, if I had not moderated its evacuation, for fear of too much weakening the patient. I put into the wound a small tent of linen, which did not so stop the aperture as to hinder the extravasated matter from being insensibly evacuated between one dressing and another. Immediately after the operation, the patient vomited no more, and was much less afflicted with the hiccup. But he did not enjoy this relief long, for the gangrene of the intestines, arriv'd at a great height, put an
end

end to his life, twenty-four hours after the operation, and the twenty-first day after the reception of his wound.

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travasated fluid, independently of the adherence of the intestines to each other, and to the *peritonæum*. This adherence was very easily destroy'd by the finger, which always happens when the inflammation is ready to degenerate into a gangrene. The bag, or cystis, we have mention'd, was internally cover'd with a blackish concretion, like that found under the lymphatic pellicule of blood coagulated in porringers. This concretion was only a line or two thick, almost thro' the whole of its extent. It was of a pretty firm consistence on that side where it was confounded with the lymphatic pellicule, but internally it was very soft, and as it were diluted. Some concretions entirely detach'd, and still more soft and diluted, floated in a bloody serum.

The case last related is not the only one in which I have observ'd, that, when there is any extravasation in the lower belly, this extravasation has but one common center. Since the observation just related, there has not died in the hospitals of which I had the charge, a single patient, whose wound penetrated into the *abdomen*, whom I have not open'd, and all these observations have confirm'd the first. I have sometimes found the extravasated blood lodged about the aperture of the vessel, without spreading very far. At other times I have remark'd, that the blood had form'd roads for itself to a considerable distance; and in this case, I have almost always observ'd, that there was a communication between the blood at the greatest distance from the aperture of the vessel, and that which, flowing last out, had really closed up this aperture by being coagulated.

It is true that I have sometimes found two or three extravasations, each of which had its distinct center. But this was the consequence of gun-shot wounds, or those inflicted by swords, which penetrating

Abstract of some other observations of the author, with remarks on extravasations in the *abdomen*.

trating far into, or quite thro' the *abdomen*, had wounded different parts, and thus open'd two or three considerable vessels, sufficiently distinct and separate from each other to form two or three and even a greater number of particular extravasations; and, even in these cases, I have often observ'd, that the particular extravasations have small communications, or continuities, so that, properly speaking, we may assert that they have a common center.

There is still a case wherein, on opening carcases, I have found extravasations multiplied, even when there was but one source to furnish the blood. This has happen'd when I open'd the bodies of persons who have died soon after their wounds, so that the extravasated blood had not time to coagulate before their death. In the following article the reader will find a reason why, in such cases, we meet with vague and multiplied extravasations. It is the difference between the concretions of blood form'd after death, and those form'd during the patient's life, that has enabled me to distinguish these cases; and I have since always remark'd, that when the center of the extravasation was vague, indetermin'd and multiplied, the concretions had the character of those form'd after death; whereas, when the concretions had the character of those form'd during life, I always found that the extravasation had but one center; and this, as we shall afterwards perceive, is an observation of very great importance.

When the blood is coagulated during the patient's life, I have always observ'd that the whole surface of the concretion was cover'd with a lymphatic pellicule, almost equally thick every where, and pretty intimately adhering to the viscera which form the center of the extravasation. On the contrary, the concretion which is form'd after death, is not cover'd with a lymphatic pellicule, at least such a one as is uniform, and extends itself equally over all its

surface. Neither has it any adhesion to the viscera, between which it is included, and from which it is as much detach'd as coagulated blood is from the sides of the porringer. The serum separated from the concretion form'd after death, detaches it from the adjacent parts, just as the serum secreted from blood coagulated in a vessel soon after disengages it from the sides.

Another very remarkable difference between the concretion form'd during life, and that form'd after death, is, that this last is always soft, of an equal consistence in all its substance, and on that account very like the concretion form'd in a porringer, except that it has not a lymphatic pellicule, at least such a one as is near so perceptible, firm and hard, as that most generally form'd on blood taken from the veins by venesection. This does not hold true, with respect to the concretion of blood form'd in the *abdomen* during life, for this is not of an equal consistence every where, since, as I have already said, it is surrounded or cover'd with a lymphatic pellicule, which, by the solidity it daily acquires, forms a sort of membrane, and is, as we evidently perceive, much firmer than the rest of the concretion. The body of the concretion form'd during life is also more solid and firm than the other concretions, especially during the first days of its formation; for, afterwards, it becomes soft, loose, and diluted. But in such cases the time which intervenes between the wound and the patient's death, seems sufficiently to indicate that the blood was coagulated during life. It seems needless to observe that there can hardly be a very sensible difference between the concretion which begins to be formed a few hours before death, and that which is only form'd after death.

There are not only differences between concretions form'd in the *abdomen*, during life and after death,

death, but I have also observed, that all extravasated blood does not coagulate in the same manner during life; and we may easily conceive, that in this, there must be an infinity of variations, according to the quality of the extravasated blood, whether arterial or venal, pure or mixed, natural or peccant; as also according to the quantity of the extravasation, and especially according to its form, that is, according as the extravasated blood is constrained to assume a particular figure, which contains more or less solidity, in proportion to its surface.

In these different cases, the coagulation of the blood must not only be more or less quick, but the concretion must have also different conditions, on which the different terminations, and consequently the different symptoms, of the extravasation will depend. It is easy to perceive the extent and the difficulty of the researches which might be made, concerning the different modifications which blood extravasated in the *abdomen* undergoes, and which are certainly no less various than those daily observ'd in extravasations of blood and ecchymoses in the external parts.

In order to finish this article, it only remains that I should mention the last case, in which we may, upon opening carcases, find extravasated fluids vaguely scattered, without any particular center, tho' the patients have not died for some days after their wounds. This happens when the adherences, which at first limited the center of the extravasation, are destroyed by any cause whatever. This unfortunately happened to a patient, whose death I greatly lament. He had received a thrust of a sword on the right side of the *abdomen*, an inch below and on the side of the navel. It was on the thirteenth day after he had received his wound that I saw him. The importance of the wound, and the symptoms with which it had been accompanied, made me very attentive

tentive to it ; and as by the signs enumerated in the third article, I was convinced, that the patient had an extravasation in the *abdomen*, I resolved next day to perform a proper operation upon him. But it happened quite otherwise ; the same day the patients were removed, and tho' I had exactly mark'd those who were fit for a transportation, as is usually observed, yet this patient, whose parents lived in the town whither they were to be transported, so importuned one of the wardens of the infirmary, that he prevailed on him to let him go, and accordingly he set out in a waggon. The desire of arriving at his journey's end made him patiently support the first joltings of the waggon, but he had hardly gone a quarter of a league, when he complained of a colic, gripes, and an insupportable pain of the whole *abdomen*. He vomited, went several times to stool, and discharged his excrements involuntarily ; his pulse became weak, hard, concentrated and irregular ; he had frequent syncope, and some hours after his arrival died under these symptoms. The surgeon, who accompanied that convoy of sick, acquainted me with what I have related, and told me that, upon opening the carcase, there were about three pints of black and very fluid blood found scattered up and down his whole *abdomen* ; and that in the epigastric region, below the wound, there were adhesions, which formed a kind of bag, in which was a little coagulated blood. This recital augmented my regret still the more, because it convinced me that the operation I intended to have performed would have infallibly preserved his life.

MEMOIR III. By M. QUESNAY.

Of the different Cases in which it is necessary to multiply the Operation of the Trepan, and evincing, by remarkable Examples, that, upon necessity, a great Extent of the Cranium may be opened with Success.

C A S E I.

FRACTURES which happen on futures generally render it necessary to trepan on both sides of such futures, Fractures on the futures. lest the *dura mater* should, notwithstanding the blow, remain adherent to the part where the future is, examples of which may be seen in the seventh and ninth observations of the dissertation on the trepan in dubious cases. In a case of this nature, the trepan applied on the future might give a shock to this membrane, for which reason it is safer to place it at the side of the future. But if we should only trepan on one side, and if the *dura mater* should really adhere to the future, this adhesion hinders the fluids, extravasated on both sides, from being evacuated thro' this single aperture. It is therefore requisite to open the *cranium* on both sides of the future, in order to give a free vent to the extravasated matter. Thus the same reason, which induces us not to trepan on the future, also lays us under a necessity of multiplying trepans. However, if, according to *Berengarius*, and some other authors*, it were true that the *dura mater* was almost always detached from the future, by the force of the blow, and if the trepanning in that part was not so much to be dreaded, as it is generally thought, it would be equally true, that it would be very seldom necessary

* See these authors quoted in *Robault's* treatise on wounds of the head. p. 89.

fary to trepan on both sides of the future. For if the *dura mater* be not really adherent to the future, all the extravasated matter may be evacuated from a single aperture, especially if the fracture was not of a great extent, and if the trepan was applied on the side to which it extended most. But experience has so often convinced us of the necessity of trepanning on both sides of the future, that this method is laid down as a precept to be exactly observed. The great divisions of futures confirm the same practice, since the discharge which these divisions furnish for the extravasated matter is often only sufficient for one side. In this case, notwithstanding the division of the future, the *dura mater* still remains attached to the edge of one of the divided bones, and this attachment forms a kind of partition, which hinders the matter extravasated under the bone to which it adheres, from being evacuated thro' the division; so that there is a necessity for proceeding to the operation, in order to procure a total evacuation to the extravasation, as is obvious from M. Mouton's observation before related. Hence it appears to be by no means probable that the *dura mater* is so frequently detached from the futures in fractures, as is generally believed, and that it is safer not to trepan on these futures, but to apply a crown of the trepan on each side of them, and even more, if the extravasation or fracture require them, as is evident from the following observation.

I. Observation, by M. Benoit, on a fracture with fissures on the sagittal and lambdoid futures.

A bombardier, fifty-five years of age, was wounded, by a musket-shot, upon the middle and hinder part of the sagittal future. The wound was attended with a fracture and fissure. M. Benoit, in order to be assured of the extent of this fracture, made a crucial incision, by which he laid bare the greatest part of the parietal bones. It happened that the fracture extended to the occipital bone,

bone, and that the operation of the trepan was extremely necessary, tho', on account of the hemorrhage, he was obliged to delay it till next day. He applied three crowns of the trepan, two on one side of the sagittal future, and one on the other, by means of which he removed several large pieces from the two parietal bones, and from the occipital. The aperture left by these pieces of bones did not render it necessary for M. *Benoit* to apply a fourth on the other side of the lambdoidal future, though this would have been requisite in a fracture which had extended beyond this future. This wound, tho' very considerable, and of the gun-shot kind, was not succeeded by dangerous symptoms, but was perfectly cured in four months.

If practice approves of the circumspection, which anatomy teaches us, not to trepan upon the futures, it is principally on account of the sinuses which are placed under some of these futures, and are attached to them, particularly the longitudinal sinus, which runs in the same direction with the sagittal future. The lateral sinuses do not lie under the lambdoidal and squamous futures, except in crossing them near the part where these two futures are united, and in repassing towards the base of the *cranium* under the lambdoidal future. Independently of the sinuses, the adherence of the *dura mater* to the bones of the *cranium*, which is stronger at the futures than elsewhere, also lays some foundation for that precept, which forbids trepanning on the futures, because we might, as we have already observed, wound that membrane when its adhesion resists the force of the blow. There are, however, some observations which shew us that there are cases in which this precept ought not to deter us from trepanning on futures.

There are some cases in which 'tis necessary to trepan upon the futures.

II. Observation,
by M. Volpiliere,
on a fracture of
the temporal bone,
in which he tre-
pan'd on the tem-
poral future.

A tanner, of about twenty-seven years of age, and of a robust constitution, fell from the top of a rock, and fractured almost all the left parietal, and a part of the temporal bone. This fracture was accompanied with a wound, which denudated a part of the superior and left lateral portion of the coronal, the whole parietal, and the temporal bone, the crotaphite muscle being entirely separated from it, as if by a dissection. M. Volpiliere ordered the patient to be blooded, and dressed the wound, taking care to preserve the detached flesh; he then ordered the venesection to be repeated, and delayed the trepan till next day. As the fracture was one of the most considerable kind, M. Volpiliere was obliged to apply two crowns of the trepan, and to place one of them on the temporal future, which was succeeded by no bad symptoms. On the same day the patient was blooded in the foot, and next day twice in the arm. The *dura mater* was gangrened as far as the fracture went, notwithstanding which the cure was happily compleated. The exfoliations began on the twenty-second day, the crotaphite muscle, and the threads which were detached, united very well, and the patient was cured of this terrible wound in two months, tho' three weeks after the operation there appeared pocky shankers on the glans and prepuce, which were dissipated by the use of proper remedies. There is one case which, above all others, renders it sometimes necessary to trepan upon the futures, and to multiply trepans; and that is, when there is a depression, or a piece of bone, which compresses the sinuses, and oblige the surgeon to make apertures on the futures, sufficient to raise the bone, or remove the fragments of bones, with that ease and precaution, which art and the safety of the patient require.

M. Garengeot speaks of a similar fracture with depression, in a child, on the sagittal future. He first applied five crowns of the trepan, which were not sufficient to enable him to raise a piece of bone, that compressed the longitudinal sinus, and kept the patient in a very violent fit of a lethargy. He was therefore obliged to apply two crowns more, one of which was on the sagittal future, that is to say, on the longitudinal sinus itself. By means of these trepans he relieved that sinus, and the child was instantly delivered from the symptoms, which would otherwise soon have proved mortal. *Scultetus** also applied to the crown of the head, round the circumference of a depression on the same sinus, five crowns of the trepan, and, by cutting between the several apertures, removed the whole depressed part of the bone. The same practitioner † applied seven for another depression on that sinus. He disengaged the piece of bone like the former, and removed it, and these operations succeeded perfectly well with him.

III. Observation, by M. Garengeot, on a fracture on the sagittal future, in which it was necessary to trepan on the longitudinal sinus.

C A S E II.

WHEN we apply the trepan for a fracture, where we perceive that the extravasation possesses a considerable extent on the *dura mater*, that the extravasated blood is no longer fluid, and that it produces very terrible symptoms, whether by compressing the brain, or irritating the membranes of that organ, we ought not, in such cases, to hesitate on making as many apertures by the trepan, as are necessary for the speedy discharge of the extravasation.

A young

* Armament. chirurg. obs. 22.

† Ibid. obs. 5.

IV. Observation, by M. *Marechal*, in which three trepans were applied for a fracture, with a great extravasation.

A young man, of condition, was struck by a piece of wood, which fell upon his head, by which means he lost all consciousness, and was seized with a discharge of blood from the ears. The skin was not broken, but perceiving a fluctuation on one of the parietal bones, M. *Marechal* made an aperture in it, and discovered a fracture about four inches long, which ended at the coronal future. In order to remove a great deal of coagulated blood lodged under the *cranium*, he judged it proper to apply three crowns of the trepan, and break the interstices between the perforations with the elevator; and this aperture procured a total evacuation of the extravasation. M. *Marechal* dressed the *dura mater* with the balsam of *Fioraventi*, and prevented the coming out, or inflation of that membrane, with a small compress, graduated so as to make a suitable compression. In consequence of this compress, he had no occasion for the plate of lead, which some recommend for keeping down this membrane in similar cases. After the exfoliation of the bone, the flesh of the wound, and that supplied by the *dura mater*, joined with each other, in order gradually to fill up the aperture of the *cranium*. The cicatrix was formed in two months, and became so narrow and solid, that there was no longer any motion of the *dura mater* perceived, and there was only a place, of the extent of some lines, which was not covered with hair.

V. Observation, by the same author, on a fracture, in which twelve trepans were applied.

M. *Marechal* was obliged, for another extravasation, to multiply the trepans to the number of a dozen. M. *Dionis* has mentioned this cure in his course of operations; but a similar example renders it necessary that M. *Marechal* himself should give us the history of it. He informs us that a young girl fell on one of her parietal bones, and made a considerable contusion, with extravasation.

travafation under the skin. He found the patient in a lethargy, accompanied with a convulsive pulse; she had also vomited and discharged blood from her ears. M. *Marechal* opened the tumor caused by the fall, and discovered a fracture which crossed the temporal and parietal bone, as far as the lapidose apophysis. In order to follow the fracture, he was obliged to continue his incision, as far as behind the ear. He stopt the blood, and next day applied two crowns of the trepan, without rendering the patient any better. On the following day two more were applied; but the symptoms persisting, there was a necessity for applying no less than a dozen. M. *Marechal* had only left about a line between each perforation, which he raised with the elevator, in order to make but one aperture of all these perforations. The last being placed very low, and near the ear, facilitated the extraction of two small portions of the lapidose apophysis. All the coagulated blood was discharged, the *dura mater*, and the lips of the wound were put in a suppuration, and the symptoms ceased.

Extravasations in which the blood is coagulated, even tho' considerable, do not always render it necessary to multiply the trepans; for when there are no symptoms which oblige us to remove the blood with all expedition, we wait till it dissolves, and can be evacuated, as we have said, by suppuration. But it sometimes happens, that this dissolution, which is always putrid, becomes highly pernicious very soon. In this case, as soon as we perceive it, we ought not to wait for the dissolution of the rest of the coagulated blood, but remove it as soon as possible. *Magatus* * furnishes us with a remarkable example, in which this dissolution quickly arrived at a considerable degree

Great extravasations do not always render it necessary to multiply the trepans.

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of

* Lib. ii. cap. 44.

of malignity; for it discovered itself on the fifth day, by various symptoms, and by a discharge of ichorous and fetid matter, without any appearance of a purulent suppuration. This great surgeon, apprised, by all these signs, of the imminent danger the patient was in, resolved, with all expedition, to remove a large quantity of coagulated and very hard blood, which had been extravasated on the *dura mater*. *Magatus* had trepann'd the patient in the first day, but a single aperture not being sufficient to remove the coagulated blood, he applied another trepan, about a finger-breadth from the former, and removed the interstice, to make but one aperture of both. The pieces of bone, which he took away, were covered with sanies, and had a very bad smell. The extravasation was so extensive, that he was obliged to crook the end of his probe, in order to lay hold of the indurated blood, which was at a distance. Notwithstanding all his attention, he could not remove all the blood, which adhered so strongly to the *dura mater*, that he could not every where disengage it. But afterwards he took great care quickly to remove the remaining blood, as soon as it fell into dissolution. From this observation we perceive that extravasated blood sometimes becomes highly pernicious in a very short time, and that we ought to be very wary of the depravation of which it is susceptible, when, in extravasations under the *cranium*, we wait for its evacuation by dissolution.

It is much less dangerous, for the patient, to multiply the trepans, in order to evacuate the extravasated juices become pernicious, than to wait for a greater dissolution, which would augment the danger; for not only great apertures of the *cranium*, such as that already said to be produced by the twelve trepans, but also much larger are easily closed up.

M. *Sarrau* informs us that he saw the whole parietal bone taken away, without producing any considerable symptoms. A child fell on the side of its head, and made a contusion, which the surgeon, who first saw it, opened. The same surgeon dressed the wound for several months, without being able to dry up the purulent matter, which was always very copious. The child became so obstinate, that he would neither keep his bed, nor observe any regimen. M. *Sarrau* being called, found a great suppuration, and, by pressing near the lips of the wound, he perceived that the matter was discharged from between the flesh and bone. But upon examining the wound and parts adjacent more attentively, he observed a considerable division in the whole circumference of the parietal, and felt that bone loose under his fingers. The suppuration discharged more and more pus, in proportion as this bone was pressed upon. M. *Sarrau* no longer doubted but this pus came from off the *dura mater*, thro' the division of the futures. Being persuaded of this, he resolved to make an incision on the greatest part of the circumference of the parietal bone, in order to lay bare its futures. He was not mistaken, for he saw the matter discharged from under the bone, in proportion as it was pressed upon. This bone was so loosened on all sides, that it afterwards partly came off of itself, and was entirely removed. The *dura mater* was almost all covered with granulations of flesh, which had sprung up under the bone before it was taken away. These granulations extended themselves farther, and reaching the edges of the hairy scalp, with it formed a cicatrix, sufficiently firm to contain and defend the brain. *Raygerius* * relates a nearly similar case of a soldier, who was successfully managed by a *French* surgeon, for a blow

VI. Observation, by M. *Sarrau*, on the parietal bone entirely taken away.

blow on his head, which fractured one of his parietal bones, in such a manner, that a portion of it, as large as the palm of the hand, was removed.

We find in *Blegny* * an observation communicated to him by M. *Tamponet*, surgeon in ordinary to the king, in which it is said, that one of the parietals came away with some laminæ of the adjacent bones. The cicatrix was so well formed, that it perfectly closed up the great aperture, occasioned in the *cranium* by the loss of that bone. We find in the works of *Saviard*, a surgeon of the *Hotel Dieu* in *Paris*, a fact of the same kind, but much more astonishing. The superior part of the coronal bone, the two whole parietal bones, and a great portion of the occipital bone, were separated at the same time. This great extent of bone, which was detached, comprehended all the capes of the *cranium*. The patient, in order to supply this part, used the bottom of a gourd to defend his brain; and cover the cicatrix which was formed after so great a loss.

There are cases in which the juices, extravasated under the *cranium*, come from too great a distance, to seek for an issue made by the trepan, or otherwise, so that a part of them can only be evacuated, whatever industry we may use in order to facilitate their discharge. We ought not, in such cases, to be content with the single aperture first made; we must, in order to procure a sufficient vent to the matter, multiply the trepans; but it is not always necessary, as in the preceding cases, to make an aperture as extensive as the place over which the extravasated matter is spread. We may, as in fistulous abscesses of the flesh, have recourse to a counter-aperture, in the part where the matter is accumulated, and where we may procure it an easy issue, as M. *Chauvin* did in the following cure.

A man

* *Zod. Apr. obs. 8.*

A man received a small wound by a fall: This wound was apparently simple, and inflicted on the superior part of the occipital bone, a little to the left. The symptoms became so considerable, as to determine the surgeon to make an incision in the place of the wound. By this means, he discovered a fracture, in form of a star, on the superior and posterior part of the right parietal. One ray of this star extended itself, on the right side, four lines beyond the lambdoidal future. He applied two crowns of the trepan, one on the occipital, and the other on the parietal bone. This operation dissipated all the symptoms, only there remained a palsy in the left eye-lid. At the end of a month he perceived, thro' the aperture made by the trepan, blood, partly fluid, and partly grumous, which had been expell'd by the pulsations of the *dura mater*. For three or four days two or three spoonfuls of this blood were discharged at each dressing. Immediately after each evacuation the paralytic eye-lid recovered its action, but two or three hours after the palsy returned. These evacuations continued, with this difference, that pus was discharged instead of blood. This pus was at first serous, but afterwards assumed a laudable consistence. He observed that this pus proceeded from a considerable distance, and that it could only be discharged during the dressing, when he depressed the *dura mater*. M. Chauvin, on searching for the source of this matter, found it under the middle of the parietal bone. By advice of M. Petit, he had recourse to a goutier of lead: This instrument was more proper on such an occasion, than the flat canula of lead, which, however, *Paré** used with success, in order to procure the discharge of matter under the *cranium*, thro' the aperture of the trepan, which was above its source. In the present case, the

VII. Observation,
by M. Chauvin,
on a counter-a-
perture in the *cra-*
nium.

* Lib. x. cap. 21.

intention was to prevent the inflation of the *dura mater* from opposing the evacuation of the matter, and the only end proposed was to keep this membrane at some distance from the *cranium*, that so it might afford a free passage for the pus, between itself and the bone. The goutier was therefore the most proper instrument that could be invented, but the too low situation of the bottom of the sinus hindered the success with which it would otherwise have been attended. M. *Chauvin* proposed a trepan in form of a counter-aperture, which was made, and, by the assistance of this goutier, which was necessary for some days, succeeded perfectly.

It is surprizing that we have so few examples of counter-apertures in the *cranium*, since analogy sufficiently shews, from their success on the flesh, the advantages which might be expected from them in the *cranium*, whenever the case is the same with that which obliges us to have recourse to them in the other parts of the body. How comes it to pass, then, that great practitioners are not apprised of the utility of them on those occasions, wherein they could not be neglected without exposing the patients to death, or at least to imminent danger? M. *Saviard** is surprized that a woman, whom he trepann'd in the *Hotel Dieu* of *Paris*, did not die, because there was matter under the temporal bone, which could not be discharged thro' the aperture made by the trepan. Happily this matter being reduced to a sanies, penetrated thro' the fracture, which extended to the bone that covered the matter; but the life of the patient was greatly endangered, by depending on such an event for the evacuation of this matter. This surgeon waited for the symptoms to determine him to a second trepan, which he was probably more afraid of, than of the presence of a sanious and consequently corrupted matter; but he ran a risque of being apprised too late. There

* Art. des exfoliations du Crâne, Obs. 4.

There are some cases in which injections may supply the place of counter-apertures. We shall hereafter relate an observation, in which M. *de la Peyronie* proposed to make a counter-aperture, in order to give vent to a purulent matter, lodged under the middle of the *os frontis*, and which could not be totally discharged thro' the fracture on the lateral part of the same bone, which is covered by the anterior part of the temporal muscle. M. *de la Peyronie*, however, was willing to try the use of injections, before he determined to make the counter-aperture, which was prevented effectually by these injections. In the days of *Paré*, surgeons would not venture to trepan under the temporal muscles, which obliged that practitioner to trepan above a fracture under that muscle, and he had recourse to injections, in order to remove the juices extravasated opposite to the fracture. By this expedient he remedied the inconveniences, to which he was exposed by a false and groundless circumspection, which was thought necessary in those times.

C A S E III. *In* CARIES.

CASES which require a multiplicity of trepans, and the removal of large portions of the *cranium*, principally occur from a caries in those parts.

M. *Daviel* relates that a caries happened to a man, in consequence of a blow received on the crown of the head, several years before. There remained in the part a pain, which somewhat abated for a while, but afterwards returned with great violence. There appeared on the part of the wound a tumor, as large as a hen's egg, which being opened discharged a large quantity of bloody and fetid pus. M. *Daviel* being called, extended the incision, and discovered a caries, as large as the palm of the hand, and in the middle of this caries an

VIII. Observation by M. *Daviel*, in which eight trepans were applied for a considerable caries.

hole as large as a crown-piece. He tried several ways to extirpate this caries, but could only succeed by the trepan, which he first applied to the part where the patient felt his greatest pain. This single trepan was so far from being sufficient, that he was obliged to apply seven others to the circumference of the caries, in order to remove all the carious part of the bone. The pain did not cease till after a total exfoliation of the bone, at the circumference of the aperture: This exfoliation was made five weeks after the operation. The large aperture was gradually filled up by flesh, which grew extremely fast, and the lips of the wound were speedily reunited, notwithstanding which, the cicatrix was formed with difficulty, but in every other respect the success of this operation was very happy. The members of the academy have since seen this man in *Paris*.

IX. Observation,
by M. Soulier, on
a caries of the
cranium.

There are certain carious cases, wherein we cannot confine ourselves to the application of the trepan, since sometimes the caries spreads and extends itself so irregularly, that we are obliged to employ different means, in order to remove the carious pieces of bones. A man, about fifty years old, and of a robust sanguine constitution, had a continual fever with redoublements, and a violent pain in the head, especially in the upper part. This fever terminated at the end of twenty-five or thirty days, but the head-ach, instead of being diminished, increased, and became so violent every evening, that the patient desired that an aperture should be made in his head, in order to discover the cause of it. The periodical returns of this augmentation of pain every evening directed a recourse to *Peruvian* bark and narcotics; but these remedies afforded no relief to the patient. There was observed on the crown of the head a kind of oedema, of about four inches
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in extent; resolvents were applied to this tumor, and the patient was frequently blooded and purged. He was also ordered to take alterative broths, and aperient ptisans, but all these remedies produced no effect. M. *Soulier* being called, and examining the part, found, in the middle of the oedema, an induration, as large as an almond, which made him suspect an extravasation in that part. This determined him to open the tumor, but as the patient was afraid of the knife, he contented himself with applying the potential cautery to the induration; and upon penetrating the eschar, pus immediately issued; which induced M. *Soulier* to extend the incision farther than the eschar. He introduced his little finger, and found that the bottom of the abscess extended to the bone, in which he felt a small cavity, produced by a caries, and capable of containing the half of a pea. Observing that pus was discharged, as it were, by the pulsation of arteries, he imagined that this pus proceeded from under the *cranium*. In order to be assured of this, he desired the patient to hold his breath, upon which the pus was discharged more copiously than before; which determined M. *Soulier* to make a crucial incision, which he filled with dry lint. Next day there was a consultation, in which it was concluded necessary to apply one crown of the trepan, near the small cavity before-mentioned. But M. *Soulier* had hardly begun the operation, when that portion of the external table which was contained in the crown of the trepan was separated, and the pus was more copiously discharged. The second table was so carious and rotten, that the probe easily penetrated it as far as the *dura mater*. M. *Soulier* perceived that the caries of the second table was more extensive than the aperture made in the external table, by the crown of the trepan. He extended the crucial incision, and next day applied a second trepan in a
part

part where the bone seemed sound enough to bear the operation. The membranes of the brain, and even the surface of that organ, were corroded and imposthumated for the space of two inches. He then, by means of the gouge, the chissel, and the leaden mallet, removed more than four finger-breadths of the first table of the parietal, which uncovered the whole extent of the caries of the second. Happily this caries had not quite penetrated the bone, opposite to the longitudinal sinus. All this caries was removed, so that the aperture of the *cranium* was about five inches long, and four broad. M. Soulier then made it his business to rectify the bad state of the membranes and surface of the brain. The exfoliation was speedily made, the aperture in the *cranium* was filled up at the end of four months, and soon after the wound was perfectly cicatrized.

M. de la Peyronie has given the history of a caries still more considerable. It possessed not only all that part of the coronal which forms the forehead, and that which contributes to form the orbits, but it had also reached the *os ethmoides*, of which it had destroyed that part which pertains to the orbit, and which is called the *os planum*: Besides, one of the temporal bones was considerably affected by it. The patient, who was a stranger, had in vain had recourse to the most celebrated physicians and surgeons of his own nation, for which reason he came to *Montpellier* for relief, and applied to M. de la Peyronie, who determined to remove the caries. But in removing the skin of the forehead and temples, he took care to leave a portion from the top of the forehead to the root of the nose, in the form of a band, that the skin of the face might not be intirely separated from that of the crown of the head, and that this portion might, by its sides, concur to the production

X. Observation, by M. de la Peyronie, wherein almost the whole frontal bone was removed, on account of a caries.

tion of the cicatrices that were to repair the skin which it was necessary to remove. *M. de la Peyronie*, for this purpose, used caustics, and, after having laid bare the caries in the manner he had projected, he perceived that the first table of the coronal bone formed a smooth arch, with many holes, thro' which he could touch some pieces of the bone of the second table, some of which were loose, and partly detached. He removed the first table; and the pieces of bone, which then appeared bare, had acquired a very considerable bulk, and such a degree of hardness, as to render them proof against instruments of the best steel. It was necessary with all expedition to disencumber the *dura mater*, which was compressed by these pieces of bones, and irritated by their irregularities and points: Trepan, elevators, forcipes, saws, files, terebras, leaden mallets, gouges, and almost all kinds of cizars, were employed in this operation; so that an uncommon courage was requisite in the patient. Almost the whole coronal was removed: Some points or elevations, which were least injured, were, however, spared, in order to sustain the cicatrices, and to diminish the deformity of them, which must have otherwise been very great after such an aperture, for he was even obliged to remove some part of the bone at the root of the nose. In order to destroy the rest of the caries, he had recourse to the essence of clove-gilly-flowers, euphorbium, the exfoliating medicines, and even fire. The exfoliation was made in about two months, on which occasion some granulations of new flesh began to appear, but a large quantity of viscid, crude, and apparently corrosive humidities greatly retarded the growth of this new flesh.

M. de la Peyronie dressed this wound twice a day with the remedies used in similar cases. This method did not succeed as he

Dressing of the wound.

could.

could wish, against the corrupted moisture, which retarded the cure, so that he had recourse to a kind of ablution, or washing, which he repeated thrice a day, for half an hour each time, sometimes with the waters of *Balaruc*, and at others with other vulnerary liquors. The changes produced by this new method of dressing were so speedy and advantageous, that he determined to send the patient to the waters of *Balaruc*, that he might have the remedy in all its force, in order to deterge more effectually, and make the cicatrix advance more speedily. M. *de la Peyronie* ordered him to be dressed three or four times a day, by pumping on the diseased part for half an hour each time, taking care that the fall of water should constantly cover the wound, so that, tho' it had nothing upon it, it received no injury from the air during these long dressings. This practice succeeded so happily, that in twenty days the wound was almost closed up.

A success so happy and decisive ought to banish all those reflections with which either timidity or prejudice can inspire us against these ablutions. Skilful surgeons, who are instructed by this experiment, and attentive to the indications presented by diseases which ought to be thus treated, will easily perceive the advantages of so salutary a method: We could, if it were necessary, here relate another cure, which M. *de la Peyronie* managed almost in the same manner; but we shall only observe, that when the waters of *Balaruc* cannot be had, the same surgeon, with great success, employ'd a lixivium of the ashes of broom-twigs, or even of the ashes of common fresh wood, in conjunction with pumping on the wound, when the patient is capable of bearing it.

This observation, which furnishes us with one of the most important facts in surgery, as well for the violence of the disorder, and the courage of the patient,

patient, as for the prudence and intrepidity of the surgeon, is one of those extraordinary instances of the respect due to humanity, which, in desperate cases, has induced great surgeons to those bold undertakings, that serve to discover more and more the force of nature, and the various resources of art, which it is certainly of great importance to know; since for want of being acquainted with those prodigies of nature and art, we often believe these diseases incurable which are not really so. Thus *Benevenius* * informs us that in a certain man, a carries destroy'd almost all the frontal bone, without injuring the skin. No body durst undertake the cure: If, however, as in the preceding case, some surgeon had been skilful and intrepid enough to perform the operations capable of removing this terrible carries, the patient's life might have been preserved, since he had strength enough to struggle with his disorder for several years after he was abandoned by the surgeons.

C A S E IV.

ALL these observations gave rise in the academy to a question which is of great use in practice, namely, how apertures of the *cranium* are closed, and what are the different means which nature generally uses in order to produce a new substance, according as these apertures are greater or less. Messieurs *Fagel* and *Morand* presented to the academy *craniums* of persons which had been cured of the trepan a long time before their death. It was found that the apertures made by the trepan were nearly closed by an osseous reproduction, and what remained by a more tender substance, which being destroyed had left a small hole in the middle of that reproduction. M. *Malaval* informs us that M. *Duvernay* shewed, in

How apertures of the *cranium* are closed up.

* Benet, biblioth. de chir. cent. 11. obs. 86.

in the royal garden, a *cranium*, in which the aperture of the trepan was closed up by a hard excrescence which had been supplied by the *dura mater*, and which in dissecting was separated from the *cranium*, so that the hole made by the trepan was entirely open, and in its primitive form. This stopple was callous, and its external surface, in appearance and consistence, resembled a budding horn; so that it was a substance very different from that of the bone, and also from that of the *dura mater*, of which, however, it was a production. Apertures of the *cranium* have been sometimes closed up by a pretty firm and solid matter, arising from the substance of the brain itself. *Fabricius Hildanus** relates an example of this in the thirty-eighth observation, communicated by M. *Marechal*. The external flesh reached that which arose from the *dura mater*, and both concurr'd in closing the aperture made by three trepans, and at last became very hard. M. *Robault* thinks that, in similar cases, the flesh furnished by the *dura mater* unites with a similar flesh arising from the diploë, for closing the aperture made by the trepan. The great aperture, mentioned by M. *Sarrau*, and occasioned by the removal of the whole parietal bone, was closed up principally by flesh, which was furnished by the *dura mater*, and at last became firm enough to defend the brain. We find, in the observation quoted from *Raygerius*, that, to supply the loss of a great part of the parietal bone, he applied a plate of silver full of holes, thro' which the flesh passed, and joined above the plate, which was inclosed by it. *Raygerius* informs us that a person might feel the plate, and its holes, by putting his finger on the cicatrix. We must necessarily doubt of this fact, since it is so astonishing, that the author ought to have had it well attested before he related it. *Borelli* informs us that he saw the hole of a trepan, made

* Cent. 2. obs. 13.

made by *John the Jew*, a celebrated surgeon of *Paris*, which was not filled up. This aperture was only covered with a very slender skin, thro' which the pulsation of the brain might be felt, tho' the operation had been perform'd eight years before.

When considerable apertures are not closed up by a cicatrix, sufficiently firm to resist the force of the brain, we are obliged to supply this defect, in order to prevent the symptoms which might otherwise appear.

M. *Marechal* informs us that a man, cured of a large wound of the head, in which he lost a small portion of the *cranium*, was from time to time seiz'd with convulsions, in which he lost his senses. He suspected that these symptoms proceeded from a suffocation of the meninges, which were distended by the brain, in the part where the *cranium* had been opened, so that there was a kind of hernia in the said part. To supply this defect, M. *Marechal* made a sort of bandage, or truss, with a cushion, to press upon the cicatrix, by which means the convulsions and their consequences were for ever removed.

XI. Observation, by M. *Marechal*, on a bandage to support too weak a cicatrix of the *cranium*.

This symptom appears much less frequently when the apertures of the *cranium* have been considerable, than when they are small. For whilst the *cranium* is open in wounds of the head, the inflation of the *dura mater* does not readily happen when the aperture is very large; and if we apply any thing after the wound is cured, in order to supply the defect of the bone, it is only with an intention to defend the brain, while the cicatrix of such large apertures is as yet weak. M. *Soulier*, who, as we have seen in the ninth observation, had removed a part of the parietal, order'd the patient to wear a slender silver cap under his wig, in order to defend
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the cicatrix. M. de la Peyronie, in the eleventh observation, informs us that a patient, whose cicatrix had destroy'd the *os frontis*, also used a plate of silver to defend the cicatrix; but perceiving that the plate galled him too much, he preferr'd a cap made partly of paste-board, and partly of leather, which succeeded much better. We also find in *Paré* * that a man, who had a large portion of the parietal removed by a caries, occasioned by a blow on the head, wore a leather cap to defend the brain, till the cicatrix was become firm enough to secure it.

* Lib. x. cap. 22.

MEMOIR IV. *By M. DU FOUART,*
Surgeon of the Hospital of Bicêtre.

On an enormous tumor : In which it is attempted, by various experiments, to determine the nature of the humours of which that tumor was formed, and the remedies which might have resolved it.

C A S E I.

THE patient, whose thigh I presented to the academy some time ago, was a man of about thirty years of age, who, on the 12th of September 1740, ordered himself to be brought to the hospital of *Bicêtre*, expecting some remedy for an enormous tumor, which proved mortal to him.

Description of
the tumor.

Upon examining the affected thigh, I found it to be two feet in circumference, so that it was at least as large again as the other.

The skin, which appeared equally smooth in all its circumference, seemed also to make an equal resistance every where ; but I observed some gentle depressions, the largest of which was not above three lines in diameter. In these depressions I perceived the fluctuation of a matter very near the surface, and which I afterwards discovered to be discharged from small pustules in the centers of those depressions, which being open at the tops, gave vent, through an almost imperceptible hole, to the liquid contained in those parts where I had felt the fluctuation. The liquor discharged from these pustules was extremely limpid, and of a reddish colour.

This is all I observed with respect to the external appearance of the tumor, except one circumstance, which ought not to be forgot, and which is, that

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the whole skin was covered with a vast number of varicose veins.

I asked several questions of the patient, in order to discover the cause of the disorder. He told me that in the middle of a journey of two hundred leagues, he had felt so violent a pain in the left thigh near the greater trochanter, that he was obliged to stop in the inn for six weeks, without any assistance from a surgeon.

He added, that perceiving some relief, though still suffering a great deal, he resumed his road, and arrived at home with the same pains, which, from his out-setting, always persisted in the same degree, till the month of *October* 1739; during which time, which makes a year, he perceived neither any inflation nor change of colour in the skin; but that the pain being since as violent and intense as during the first six weeks, there was formed at the greater trochanter, a tumor, which, from its first appearance, had never ceased to augment.

This was all I could learn from the patient; in vain I carried my researches farther, neither did I find the smallest sign of the pox, the scrophula, or the scurvy.

The patient in this state could still walk, notwithstanding his violent pain. But every time he pressed his heel on the ground, the pain became so violent that he forthwith fell into a syncope.

The tumor, by its daily augmentations, soon became so considerable, that the patient could no longer walk, and continued to increase by a sensible progress, till *February* 8, when he died.

During the last fifteen days, there oozed, in the form of dew, an extremely clear water, from the whole surface of the tumor, whose circumference was at that time three feet; and the weight, including that of the thigh, was forty-one pound and an half.

Mess.

Mess. Gramont, Sorbier, and Hevin, were present at the dissection which I made of it. I found that the tumor was divided into three cystises, or bags; the first and most considerable of which occupied all the fore part of the thigh under the crural, the *gracilis anterior*, and the two *vasti* muscles, all of which were extenuated, without however being confounded with the tumor.

Dissection of the tumor.

State of the muscles of the part.

The second cystis, or bag, was no more than the propagation of the tumor, which was continued under the *femoralis major*, and the *fascia lata*, passed afterwards through the hollow of the thigh, and entered into the basin, where it formed various eminences or prolongations, full of an humour which was more or less thick and like a jelly.

The third cystis extended all along the interior and posterior part of the thigh, and joined the second towards the tuberosity of the ischium.

I removed the two last parts in order to penetrate more easily to the center of the tumor, and separated the thigh from the *ossa ilea*. The articulation was in a good state, the head of the thigh-bone, and the *ligamentum rotundum* were no greater than ordinary, but the bone was fractured two inches below the little trochanter.

It is natural to think that the pain was first felt in that part, or that it was precisely the place where the morbid cause, whose progress afterwards extended itself so far, first discovered itself.

I ought not to omit two circumstances which I discovered in the dissection, and the singularity of which seems to merit the attention of the reader.

The first of these circumstances is, that the tumor had its seat in the periosteum alone, since its external surface was precisely the external surface of that membrane; for the band of muscles

It had its seat in the substance of the periosteum.

implanted in the femur, or thigh-bone, were seen bare on the out-side of the tumor, so that the surface of the periosteum, and the band of muscles, which were raised together by the humours that formed this heap of matter, were distant from the body of the bone, by the whole thickness of the tumor.

A solid, and, as it were, bony concretion at the center of the tumor.

The second circumstance relates to a bony concretion, or rather a white and friable matter, which I found in the middle of the tumor. This did not in the least adhere to the bone, from which it was separated by the flesh, or substance of the tumor, which covered and surrounded it every where equally. What is principally to be observed in this concretion is, that the strata of the matter which forms it, are not a composition truly solid, since the parts of them are very friable, and may be separated almost as easily as the parts of a calcined bone. They do not even produce an uniform and continued mass, since they are separated from each other by an infinity of pores, or very sensible interstices. In a word, they do not form an organic whole, since they only constitute a congeries of irregular laminæ, such as congestion might have thrown together, without vessels, without intermediate fibres, without connection, order or regularity: In short, they are only juices so inspissated as to assume an apparently bony consistence, and these juices being at first poured from the open mouths of the vessels destined for their conveyance, have afterwards united by the single obstacle they found to their diffusion, and have thus formed an irregular assemblage, which has no other form than what was prescribed to it, by the greater or less resistance

which

which the substance of the tumor has opposed to the extravasation of those same humours.

C A S E II.

THIS is almost all I could observe, either by the external appearance, or by the dissection of the tumor. It is not necessary that I should enter into a detail of the remedies I used for the relief of the patient, so that I proceed to the first experiment I made, in order to discover the species and character of the humour which formed this tumor.

Experiments to discover the nature of the humours of the tumor.

I first took a slice of the tumor, and threw it into hot water, and though this portion was before smooth, soft, and little elastic, yet I immediately after drew it out of the water, grumous, or rather granulated, in all its surface; hard, and horny in its substance, and almost as elastic as bend leather.

Experiments by the action of fire, which discover gelatinous juices.

This effect of the hot water on the tumor seems evidently to represent the character of albuminous juices, that is, of lymph, which, we know, is hardened by the fire, as well as the white of an egg. However, as at the first glance of the eye this tumor appeared to be of the pinguious kind, and as I had often seen true fat become harder by being thrown into boiling water, surprised as it were by the heat, I expressed the juice of the tumor, in order to observe the effect of hot water upon it. If it should be fused, I must necessarily discover the nature of pinguious juices, or at least the nature of juices very different from the lymphatic. If, on the contrary, it should harden, this proof, joined to the former, must show me the cha-

rafter of a lymphatic juice. The success of my experiment was as follows.

The express'd juice, which had the consistence of a pretty thick jelly, far from being hardened in hot water, was totally fused in it, and mixed so well with it, that it rendered it all equally turbid, without my being able to discover any fat floating on its surface.*

Experiment by the action of fire, which discovers lymph in the tumor.

Hence we may conclude, that these juices must be of a lymphatic nature, according to my first observation. Besides, they were perfectly mixed with the water, and no fat appeared to float on the surfaces; whence we may moreover observe that they must be pinguious. Then I could not avoid discovering the true character of gelatinous juices, whose property it is to assume the consistence of a jelly by cold, to be fused by heat, and to mix with water.

I had now got an insight into the nature of those juices, by help of all these marks; it however remained for me to investigate, why the first experiment presented me with no other phenomenon, than the induration of that part of the tumor which I threw into the water, when at the same time the property of gelatinous juices is to be fused by heat. Not being able to doubt after the experiments I had made, but these last juices constituted the predominant part of the tumor, I concluded, that

* M. Bouquet has also communicated an observation of an enormous tumor, which possessed all the thigh. He threw slices of this tumor into boiling water, which hardened them. This made him think, that the juices of this tumor were entirely lymphatic. These juices were so inspissated, that they could not be expressed, to try them alone by the heat of boiling water. The different kinds of experiments made here, and which have discovered a great deal of gelatinous juices, make us suspect that the tumor, mentioned by M. Bouquet, was entirely formed of lymphatic juices, for it appears to be of the same nature with that described here. The academy desires those who have an opportunity of seeing similar tumors, to make the experiments here specified, and others, in order to be assured whether all these tumors are formed by the same kind of juices.

that if the heat of the fire had not fused them, it was only because I had misapplied its action. Returning therefore to my first tryal, I imagined that the first shock of the heat might have indurated the vessels, and even the albuminous juices, and by this means have imprisoned, if I may so say, the gelatinous juices, and so prevented their flowing, notwithstanding their fusion; whence I presumed, that by pushing the heat farther, the gelatinous juices being fused and rarefied, might, by their expansion, break through the vessels and albuminous juices, and thus make a vent for themselves. These conjectures were confirmed by experience: I took a portion of the same tumor, and put it in a stove, over a very clear and brisk fire; after crackling for some instants, this part of the tumor was almost entirely fused, upon which I took out the juice, which in cooling assumed the consistence of a true jelly.

What I had done by subjecting the part of the tumor to the fire, without the intervention of water, I thought I could also effect by water, provided I employed a longer continued heat. I was not deceived in my opinion; for a portion of the tumor, after being indurated in the water, as at the first tryal, afterwards became soft, diminished gradually, and at last, after two hours boiling, yielded a juice, which gave the water so gelatinous a character, that a few moments after it was taken off the fire, it assumed the consistence of a glue, more than moderately thick.

I warmed and cooled these two matters frequently, as well that obtained by the stove, as that procured by the ebullition. The heat always fused them, and the cold always inspissated them in form of a jelly; with this difference, however, that the jelly obtained by the boiling in hot water, was more strong, glutinous, adhesive, and elastic, than

that which I extracted by the stove. It appeared unnecessary, after all these experiments, to enquire farther into the character of the gelatinous juices which formed this tumor. However, I was willing to try whether by the salts, which are known to be proper to these juices, they still sustained their character.

A surgeon, who has not neglected the improvements which medicine can impart to our art, has demonstrated, that the gelatinous juices are impregnated with all the essential salt of the chyle, that this salt is truly acedent, that boiling even changes its nature so little that on the first spontaneous motion it becomes highly acid, as we see in broth, which is nothing else than water impregnated with the gelatinous juices extracted by ebullition. Conducted by these discoveries, for which I was indebted to the works of that author, I fused a certain quantity of the jelly. I mixed one part of it with syrup of violets, another I poured upon blue paper, and the remainder I put into an untinned and very clean copper vessel. The syrup of violets had its colour changed, the blue paper became red, and the copper in less than twenty-four hours was covered with verdigrease, which fell off in flakes or scales. By these effects, which are proper to acid salts, it was impossible not to discover the nature of the juices which were impregnated with them. I was therefore no longer dubious with respect to this affair, since the assemblage of all the phenomena, the fusion by the heat, the inspissation by the cold, the dissolution of the copper by the salts, the change of colour in the syrup of violets, and of the blue paper by the same salts, concurr'd to furnish me with the most evident proofs.

Though I had no longer any doubt with respect to this point, yet I doubted very much concerning
another

another, in which I thought it equally important to be satisfied. You may remember that, in the first trial, the induration had made me suspect a lymphatic character in the juices, but in the last trials, no phenomena had favoured the existence of such juices. Far from being indurated by the fire, they were fused by it, as I have often said; and in cooling, I neither observed any sediment, nor any of those filamentous concretions observed in the water in which the blood has been received from the arm or the foot. But then, were these negative proofs decisive enough, think you, to conclude against the presence of a lymphatic juice in the tumor? I did not think so, and thought I had good reason, not only from the first experiment, which seemed to favour the existence of this juice, but also from another circumstance, which was only mentioned by the bye, but ought to be remembered here, which is, that the juices extracted from the tumor, especially those obtain'd by boiling, assumed in cooling a consistence, cohesion, and tenacity, which are not to be observ'd in the strongest jellies. Now to what can we attribute this extraordinary tenacity and consistence, if not to the lymphatic parts mixed with these juices? At least this was what I imagin'd, neither was I surpris'd, that the jelly obtain'd by the boiling in hot water, was much stronger than that extracted by the stove, because it is evident that the hot water, by gradually macerating the portion of the tumor, must have carried off a pretty large quantity of the fibrous or lymphatic parts; whereas, on the contrary, the violent heat of the stove must have at first indurated these last juices, so that the gelatinous juices in their fusion could only carry off a very small quantity of them.

These

Experiments by
different mixtures,
in order to disco-
ver the lymph.

These ideas were not without foundation, but still I wanted to be absolutely certain, to discover the substance of the lymph in itself, and to separate it, if possible, from the other juices with which it was blended, in order afterwards to make, upon this separate humour, the experiments which might best ascertain its nature. I determin'd, therefore, to pour upon the fused jelly, such substances as I knew were proper to fix and inspissate the lymph. I successively employ'd spirit of vitriol, spirit of wine, and volatile salt of vipers. My attempts were followed with the success I hoped: The spirit of vitriol precipitated a *coagulum*, which equall'd about the sixth part of the whole liquor, and whose consistence was glairous, and but little tenacious. The spirit of wine, after exciting a great effervescence in the jelly, which its mixture seem'd to render milky, also precipitated a *coagulum*, like the vitriol, but much larger, stronger and more tenacious, than that which the acid mineral had afforded. The same effects were produced, but in a more remarkable manner, in the mixture of the salt of vipers with the juices of the tumor. The effervescence was at first extremely violent, the humours appeared to be inspissated and whiten'd much more than with the spirit of wine, and almost in a moment was form'd a *coagulum*, equal, or nearly equal, to the whole bulk of the mix'd liquors, but of so great a hardness and tenacity, that I could scarce thrust a needle into it, or pull it out again. By these phenomena I could not chuse but discover the existence of the lymph. These concretions, furnished by the mixtures of the spirit of vitriol, salt of vipers, and spirit of wine, evidently evinced the presence of the albuminous juice, whose property it is to be inspissated in the same degree as just observed by the experiment. It is thus that we perceive the fibrous parts of the blood,

in

in a porringer, assume a moderate consistence with spirit of vitriol, and one somewhat stronger with spirit of wine, which is still much surpassed by that obtained by the salt of vipers. Tho' I might have contented myself with these experiments, I was not yet satisfied: The lymph had been sufficiently discovered by all these tryals, but it still appeared something singular, that this lymph, which constituted a good portion of the juices, should afford no filamentous concretion, such as that observed in the water in which venesection in the foot has been performed, in which, however, there is certainly a much smaller quantity of lymph.

It is true, I could not expect any of these concretions so long as the heat kept the gelatinous and lymphatic humours in fusion, for the same reason that we see no similar concretions in the water in which the foot has been blooded, so long as this water remains warm. But why did not this mixture of gelatinous and lymphatic juices permit in cooling, as well as the water, the approach and agglutination of the fibrous or albuminous parts, in order to form the whitish filaments observed in the water? I imagined, that, after some reflection, I had found out the true reason of this phenomenon. The fused jelly was hardly taken off the fire, before it resumed its gelatinous consistence; so that the lymphatic parts, pent up by those of the gelatinous kind, which were fixed, could by no means, notwithstanding their affinity, approach and unite, in order to form those lymphatic flakes observed in the water used for venesection in the foot. This reason to me appeared so plausible, that I thought I might expect the formation of these flakes, if I mix'd with the jelly a quantity of water sufficient to hinder it from resuming, at least for some time, its gelatinous consistence. Accordingly I fused a certain portion of the jelly in a cylindrical vessel, and pour'd double the quantity
of

of cold water upon it, when immediately I had the pleasure of seeing much more than I had expected; for the water was hardly mixed with the jelly, when the flakes were forthwith form'd, and subsided in the form of a thick snow.

I would fain have taken the lymph, which I had just seen separated from the gelatinous juices, in order to make such experiments on it, as might best ascertain its nature. I therefore waited almost half an hour, with a design to decant the liquor, and afterwards take the lymphatic sediment. But, instead of this operation, I was obliged to perform another. The juices, notwithstanding the large quantity of water I mixed with them, became fixed a second time, and resumed the consistence of a jelly, which did not hinder me from separating the whitish and opaque sediment that was seen at the bottom thro' the jelly, which was every where very clear and pellucid, except towards the bottom. Having separated this sediment, which was as yet much impregnated with gelatinous juices, I fused these juices by the heat of my hands in handling the lymphatic flakes, by which means I obtained a pure lymph, on which I made the following experiments. I put it in spirit of wine, which hardened it extremely; then I exposed it to the fire, which, far from fusing it, at first shrivell'd it up, and then calcined it.

All these experiments demonstrated the existence of the lymph, and its mixture with the gelatinous juices, so that nothing was wanting to compleat my wishes, but to determine, as nearly as might be, in what proportion these juices were mixed. But a part of the experiments, I had before made, seem'd sufficient to decide that point.

The proportion in which the gelatinous and lymphatic juices were found in this tumor.

The part of the tumor which I had exposed to the fire, in the stove, was much diminished; but this

this diminution, however great, amounted at most to no more than four fifths of its weight and bulk, so that what remain'd in the stove made a good fifth of the whole substance on which I had tried the experiment. Now, certainly, this remainder was nothing more than the concretion of the lymphatic juices, excepting always the vessels of the periosteum, which cannot come into the account, as being but an inconsiderable portion of those which compose that very fine membrane. We may, therefore, affirm that in this remainder there was at least a fifth of lymphatic humours. But again, on the other hand, the gelatinous juice fused in the stove had certainly carried off a part of the lymph, so that there was more than a fifth of this humour in the juices which form'd the tumor.

The remainder, left by the boiling in the water, join'd to the sediment obtained by means of cold water from the jelly extracted by the same boiling, furnished me with a still more accurate calculation. The remainder of the boiling, indeed, was no more than a sixth part, but the other sediment, which I spoke of, amounted to an almost equal quantity, since it occupied nearly two lines in the cylindrical vessel, into which I had only put about an inch of the fused jelly. It is true that this sediment was not intirely lymphatic, but it is also probable that much of the lymph was not precipitated by the mixture of the cold water; for it is very probable that a large portion of this humour, intimately mixed with the gelatinous juice, had remained suspended in it. Due allowance therefore being made, by taking the lymphatic sediment nearly for a sixth, including the part of that albuminous humour, which remained among the gelatinous juice, and by adding this quantity to the remainder of the boiling, which I also said equall'd about a sixth, we shall find that the lymphatic juices amounted almost to a third of the

the juices of the whole tumor ; so that we may affirm, at least without fear of any material error, that it consisted of two thirds of gelatinous, and one third of lymphatic juices.

Before we proceed to the experiments I afterwards made, in order to discover the substances which would have been most proper for the resolution of the tumor, I shall make some reflections on those of which I have already given the detail. It is easily obvious that if we had confined ourselves to the first experiment, that is, to the induration of one part of the tumor by boiling water, or to the result of mixing salt of vipers with the juice of the tumor, these two experiments evincing only the existence of lymph, we should not have discovered any other humour in the tumor. We may make the same remark on those experiments which discovered the gelatinous juices, that is, on the fusion of the humours extracted by heat, and on their concretion in form of a jelly by means of the cold. We may assure the reader, that if we had begun with this last experiment, and neglected the first, we should have imagined that the gelatinous juice alone had form'd this tumor, notwithstanding which, we see how important it was to discover the different juices of which it was really composed. Hence we may easily conclude, how essential it is, when we want to penetrate into the true constitution of mixed substances, to multiply trials, and not to content ourselves with single experiments, which, instead of enabling us to discover truth, often tend to plunge us into error, especially since what they discover, or seem to discover to us, is always a mixture of truth and error.

The second remark we shall make is, that our experiments, notwithstanding their first appearances, ascertain the distinctive characters of the gelatinous and lymphatic juices ; for if the gelatinous juices did

did not discover themselves by their fusion, when we only threw a piece of the tumor into boiling water; and if, on the other hand, no lymphatic concretion evinced the presence of an albuminous juice, either in the fusion of the expressed juices, or in their concretion in form of a jelly, we must have been obliged to recur to foreign circumstances, which might have prevented these effects, since they were afterwards perfectly obtained as soon as such circumstances ceased. When we separated the lymphatic parts from the gelatinous juices which kept them divided, they reunited again, assum'd a filamentous form, and were indurated by the fire. In like manner, when we removed the obstacles to the gelatinous juices, form'd by the induration of the lymphatic, we observ'd that the former were fused, and immediately flow'd; so that our experiments, far from weakening the character assign'd to these juices, confirm it in a manner the least equivocal. I now proceed to the experiments I made, in order to discover the remedies, by means of which the resolution of this tumor might have been most probably obtained.

C A S E III.

IT was natural to think that the remedies capable of keeping the gelatinous juices in fusion, and fusing them when they were fix'd into a jelly, were most proper for resolving this tumor. I made it my business then to discover these re-
medies, but before I made my first
tryals on the expressed juices, I was willing to see what effect simple hot water would produce on a part of the tumor which remained. I therefore threw this piece into water some degrees warmer than its natural heat (that is, as hot as the hand can easily bear it) which was sufficient to fuse the gelatinous, without indurating the lymphatic juices.
I kept

Tryal by heat.

I kept the water in the same heat for eight hours, during which time the part of the tumor lost near a tenth part of its weight. This effect is the more remarkable, because the parts of the water, with which the portion of the tumor was impregnated, might also make a considerable part of the remaining weight. This first experiment was succeeded by one made with such substances as appeared capable of keeping the expressed juices in fusion. I had no hopes of expecting this effect, either from spirit of vitriol, or that of wine, and still less from the salt of vipers. You may remember that these substances had precipitated a *coagulum* more or less considerable; but I must add that the remainder of these precipitations had not less assumed the consistence of a jelly, except that obtain'd by the mixture of the salt of vipers with the juices of the tumor; for this remainder, which was in a very small quantity, continued always very liquid and clear. But this exception is so far from proving the resolvent virtue of this salt, that the circumstances of the experiment demonstrate that the present phenomenon can only be ascribed to its inspissating force. It is to be remember'd that the *coagulum* form'd by it, almost equall'd the bulk of the matter on which the experiment was made, and that the hardness of this *coagulum* scarce yielded to that of horn. It is not improbable that some aqueous parts might have been expressed from it by the force of the coagulation, and that these, being thus separated from the other parts susceptible of concretion, may have preserved their liquidity; setting aside then the substances I have now mention'd, I at first directed my views to vegetable acids, and then to neutral salts.

It was not without reason that I preferr'd these substances to the other. The fusing and resolvent virtue of sal-ammoniac, attested by so many happy cures in the common practice

Tryals by various mixtures.

practice of surgery; and agreeably to the observations of M. *Quesnay*, the effects produced on the blood by acescent salts which are not bitter, acid salts of the vegetable kind, most neutral salts, and especially sal-ammoniac, in a great measure convinced me what I might expect from a mixture of substances. Having, therefore, fused a part of my jelly, I divided it into four portions, each of which I mixed, separately, with an equal quantity of common vinegar, distill'd vinegar, syrup of violets, and sal-ammoniac. The common effect of these three last liquors, was to maintain their respective portions of jelly in fusion, and especially the sal-ammoniac preserved it in a perfect liquidity, but the common vinegar did not hinder it from assuming a pretty strong gelatinous consistence. This so different effect of the common, from that of the distill'd vinegar, would have surpris'd me, if I had not observed that in making the experiment I had used recent vinegar, which was consequently impregnated with ardent spirits, as was obvious from its vinous smell. It is evident that this liquor, on account of its inflammable spirit, must partake of the nature of spirit of wine, and consequently produce those effects whose similarity denoted the presence of the same principle.

The effect of these substances, which had kept the juices in fusion, seem'd to promise fair for their efficacy in the resolution of tumors similar to the present; and this prejudice in their favour would be much stronger, were these substances capable not only of maintaining the fluidity of the gelatinous juices when fused, but also of liquifying and fusing them when they were fixed into a jelly. I was, therefore, impatient to try what effect a mixture of these substances would produce on the jelly itself. On the other hand, being curious to see what effects the former substances would produce on this jelly

when not fused, which being mixed with the juices in fusion had hasten'd the gelatinous concretion of them, I was eager to try the effects of the same substances on the juices when fixed. Having, therefore, divided all the jelly which was left, into as many portions as I had substances wherewith to make experiments, I mixed each, separately, with a portion of the jelly I had thus divided. The mixture of the mineral acid, as also that of the spirit of wine, and of the salt of vipers, produced the effect which might have been naturally expected. If the spirit of vitriol did not indurate the jelly, so neither did it soften it, at least in a sensible manner. The two other substances indurated it intirely, and this effect was principally observed in the jelly into which I had pour'd the salt of vipers. As to the other mixtures, they produced the following effects: The common vinegar and syrup of violets only softened the jelly, whereas the distill'd vinegar and sal-ammoniac fused it totally, with this difference, that the sal-ammoniac instantaneously produced this effect, whereas the distill'd vinegar only did it gradually. It is also to be observ'd, that this acid did not give to the fused juices, a liquidity equal to that found in the jelly fused by the sal-ammoniac.

I could have wish'd to have tried what would have been produced, on the fixed gelatinous juices, by the mixture of a great many other substances, such as different neutral salts, saponaceous oils, camphire, decoctions, salts, or extracts of sudorific woods, and especially the juices of the *solanum lignosum*, baum, feverfew, the roots of elicampane, briony, the *sigillum mariæ*, the *corona imperialis*, and others, which the experiments made by the author we have quoted, seem to place in the rank of the dissolving remedies we want, which are thought to be very numerous and well known, tho' they are far from being so. But having used all the jelly
in

in the preceding experiments, and not being able to extract any from the rest of the tumor, which was putrified, all I could do, was to try common salt, and salt of succory, which I had by me, not on the pure jelly, since I had none left, but on a portion of that limpid jelly, which I had obtain'd by a mixture of gelatinous juices with double the quantity of cold water, and which had been preserved by chance. The effect of each of these salts was pretty speedily to fuse this clear jelly; but whether they would have produced the same effect on the pure jelly I cannot say, nor can hardly presume to expect.

Such were my experiments, and I could wish to have carried them farther, if circumstances would have permitted. I shall now draw such consequences as seem most naturally to arise from them.

Application of
these experiments
to practice.

1. The effects of the ardent spirit, and of the salt of vipers, evince that it was not from such substances that we were to seek for remedies for the resolution of this tumor; and if so many authors have celebrated these substances, as attenuants of sovereign efficacy, this circumstance only proves that they have consulted their own imaginations more than experience.

2. If we could have efficaciously attempted the resolution of the tumor, it must have principally been by a bath of warm water, strongly impregnated with spirit of sal-ammoniac, and whose action ought to have been seconded by general remedies, and especially by purgatives seasonably exhibited, with an intention to eliminate the matter of the resolution.

3. We might have perhaps employ'd, with great advantage, plants furnish'd with gently acid or acescent juices, especially in rendering their action more efficacious by the addition of sal-ammoniac, or even some other neutral salts.

4. Among the different remedies which might have been employ'd whilst the tumor was curable, sal-ammoniac would have been of all others the best. The proof of what we advance, may be drawn from this, that this salt unites together two virtues, that of fusing the juices inspissated in the vessels more effectually than the other substances, and that of powerfully exciting the action of the same vessels. These are advantages which we do not find in vegetable acids, which certainly by their astringent action weaken or retard the organic movement of the parts. So that tho' acids were as resolvent with respect to the fluids, as sal-ammoniac, yet this salt would still have the preference, because it excites the action of the vessels, whereas acids check it by their astringency.

Tho' the resolution of the tumor may possibly be attempted with success by the remedies we have mention'd, we would not have it thought that on account of their experienced efficacy, we believe they may be used with advantage in the last stage, or time, of the tumor; for we are persuaded, on the contrary, that the most powerfully fusing or resolvent medicines would be useless in such a juncture.

Such, doubtless, was the weakness of the natural heat in the tumor, that the juices must necessarily have been inspissated in them, or perhaps in some measure even fixed; but it is not this state of the humours, in the last time of the tumor, that should make us look on the application of all remedies as useless; it is the state of the vessels, in which the greatness of the obstruction must almost totally destroy all organic motion, not to mention the mortal shock given to the vital principle, by the malignity of the juices, which so long a stagnation must reduce to an extreme depravation. But if, on the one hand, we are convinced that we should have in vain attempted to restore life to the mortified vessels;

vessels; and if, on the other, it is evident, as physiology teaches us, that it is only by the action of the vessels, that stagnant juices can resume their course, and fall in with the circulation, it would have been of no service to attempt the fusion of the inspissated humours, when, by extinction of the organic motion of the vessels, there was no longer any agent able to push them out of the place of their stagnation.

I have said that the juices must have fallen into a great depravation; this is the natural consequence of their long continuance in the tumor. But if it were asked, what was the perversion of each particular juice which form'd it, that is, of the gelatinous and lymphatic juices, we must, in order to resolve this question, have recourse to the facts already mention'd. The reader will easily recollect, that the tumor was suppurated in many points, and that an ichorous suppuration had even render'd the bone intirely carious. Now certainly these suppurations were putrid, and could not fail to affect the lymph, since it is evident that the first and only spontaneous motion, of which it is susceptible, is that of putrefaction. We know that this does not hold true of the gelatinous juices. But tho', by the character of the salts with which they are impregnated, they might have resisted a tendency to putrefaction, they must, however, have contracted that kind of depravation, which corresponds to the nature of aciescent salts, that is, they must have fermented, at least imperceptibly. The facts here evince what the knowledge of theory made probable. The gelatinous juice of the tumor made the blue paper red, and covered the copper with verdigrease, that is to say, it produced the effects which are constantly produced by disengaged acids, such as those yielded by acid fermentations, but which are never

State of the depravation of the juices of the tumor.

disengaged by salts simply acefcent, fuch as thofe of the gelatinous juices unfermented. Hence it follows, that in the prefent obfervation, fermentation muft have given a very confiderable character of acidity to the gelatinous juices of the tumor.

I believe, after thefe difcoveries, the perversion of the humours of the tumor is not to be called in queftion. What is remarkable is, that the enormity of the obftruction did not fooner contract a putrefaction. But we know, that acefcent falts, with which the gelatinous juices are impregnated, are naturally antiputrid, and become more fo by the new degree of acidity, which fermentation gives them; to this we may add the air's being deprived of accefs to the juices diftributed and included in the texture of the tumor, and the little fluidity of thefe juices. It is not therefore furprifing, that, fince the gelatinous juices predominated in the tumor, they have preferved it from putrefaction for fo confiderable a time.

What we have faid may authorife us to draw fome consequences, which we fhall venture to do, not fo much becaufe we believe them undoubtedly fure, as becaufe they are interefting in themfelves, and make us fenfible at leaft of the importance of thofe obfervations, which may either verify the juftnefs of them, or demonftrate their falftiy. We fay then, that there feems to be ground for us to conclnde, from what was obferved in the laft place,

1. That among the tumors, formed by the congeltion of white juices, thofe which remain long without any change, tho' they are not fcirrhou, are probably congeltions like that mentioned in this refearch, that is, they are principally formed of gelatinous juices.

2. That

Why the ftagnant
juices have been
long preferv'd
from putrefaction.

Conjeftures rela-
ting to practice.

2. That if, among the congestions of white juices, there are some which assume a scirrhus character, these differ from the first, in that they seem to be principally formed, not of gelatinous, but of lymphatic juices; for the property of heat is to indurate the lymphatic humor, and, on the contrary, to preserve the liquidity of the gelatinous juices by keeping them in fusion; not to mention that these last juices are only at most susceptible of a gelatinous, but not of a scirrhus concretion.

3. That as scirrhus concretions are only formed *for the most part* * in the glands, so it seems to follow from that circumstance, that the juices lodged in these organs are rather lymphatic than gelatinous.

4. That it is infinitely more dangerous to attempt the resolution of lymphatic congestions, when considerably old, than that of obstructions formed by gelatinous juices, tho' these obstructions should not be more recent †. The reason of this difference is, that in old lymphatic congestions we run a risque of exciting a motion of putrefaction, which, as we have observed, is the only one of which the albuminous juices are susceptible §; whereas, on the contrary, we need never dread a similar motion in the gelatinous juices.

* *For the most part* is added, because there may be lymphatic obstructions in the fleshy parts.

† Besides, how is this resolution possible in tumors where the lymph is not divided by some juices, and where it is greatly condensed by others? We, as yet, know no dissolvent which can act on the humour when inspissated. Sal-ammoniac itself cannot divide it. M. de la Peyronie sent from Fontainebleau to M. Quesnay a tumor of a breast, which he had amputated. M. Quesnay cut some slices of it, and put some of them in water impregnated with sal-ammoniac, and others of them in vinegar saturated with the same salt, but at the end of eight days found them all in the same state in which he put them in.

§ However, the resolution which may be attempted by sal-ammoniac is less dangerous, because that salt powerfully resists putrefaction. Perhaps it may be dreaded lest it should irritate the part, and excite an inflammation, succeeded by a suppuration, which would favour putrefaction. But it is to be remarked, that sal-ammoniac, tho' of an active nature, is scarce at all inflammatory.

MEMOIR V. By M. QUESNAY.

Abstract of Observations on the Exfoliation of the Bone of the Cranium: With Remarks on the Means to be used either for hastening or preventing the Exfoliation of that Bone.

C A S E I.

EXFOLIATIONS sometimes greatly retard the cure of wounds of the head, and the remedies generally employ'd to hasten these exfoliations do not always succeed, which has engaged surgeons to find out some other more efficacious method. They have experienced, as we shall see in the following observation, that, in certain cases, we can greatly advance this operation of nature, by making many small holes on the surface of the bone to be exfoliated.

I. Observation, by M. Tursan, on the use of the perforative trepan, in order to hasten the exfoliation.

A coachman, subject to the epilepsy, fell from his seat, and made a contusion, with an ecchymosis, in the superior and middle part of the right parietal. When that tumor was opened, there was only perceived in the *cranium* a slight impression, without fracture. But the symptoms, which were considerable, and persisted, left no reason to doubt but there was an extravasation under the *cranium*, and that the trepan was consequently necessary. The operation was very long, because the bone was extremely thick, hard, and without a diploë. It, however, succeeded very well, except the exfoliation, which was in vain expected at the usual time. Two months and an half expired without nature's making any advances that way. This retardment made it necessary to have recourse to the perforative trepan; but the success of it seem'd dubious, because the bone was extremely hard, and with-

without any appearance of a diploë. M. *Tursan*, however, determined to make several holes in the first table of the *cranium*. This expedient succeeded beyond his hopes, for a few days after, small granulations appeared through these holes. This flesh growing daily by little and little pushed out the bone, which was to be separated by the so long expected exfoliation.

The operation to which M. *Tursan* had recourse, in order to procure exfoliation, is proposed by M. *Beloste**, but with views intirely different; for it is to hinder the exfoliation of the bone that he has advised it, that is to say, he proposes it instead of the *rugine*, which some have recommended in a similar case, and with the same intentions. Neither does he prescribe this operation, except in recent wounds, where the bone is not as yet altered, in which case the holes furnish flesh, which by little and little covers the bone again.

However, this observation does not always succeed, either in the one or the other case, as M. *Boutentuit* has remarked. A man, by a fall, made a wound almost circular, of an inch and an half in diameter, upon the superior and lateral part of the coronal. This bone was laid bare, and it was proposed, in order to hasten the cure of the wound, to hinder the exfoliation of the bone, and for that purpose to have recourse to M. *Beloste*'s expedient. M. *Boutentuit* accordingly made, with the perforative trepan, small holes, deep enough to reach to the diploë; and expecting the little granulations of flesh which were to appear thro' these holes, he dressed the wound with the balm of *Fioraventi*, and vulnerary water. He continued his dressings a month, without any thing appearing thro' these holes. He perceived, on the

II. Observation, by M. *Boutentuit*, on the bad success of the perforative trepan, either to hinder or hasten exfoliation.

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* Chirurg. d'Hopit. p. 85.

contrary, that the bone lost its natural colour, and altered in such a manner, as that he had nothing to expect but its exfoliation. M. *Boutentuit* then left the patient under the care of his surgeon in ordinary, who continued to dress him six weeks longer. Afterwards M. *Boutentuit* was called, and found the wound in the same state with respect to exfoliation: He examined the wound attentively, and observed that the flesh of its lips had inclosed the piece of bone which ought to have been exfoliated; he immediately disengaged and removed this piece, which was about an inch and an half in diameter, and its thickness comprehended almost the whole of the external table of the *cranium*. The flesh below was of a lively red, and intirely covered the bone. There was no further obstacle to the cure, which was compleated in eight or ten days after the exfoliation.

Exfoliation retarded by the flesh of the lips of the wound.

This observation sufficiently proves the uncertainty of the success of the operation which had been tried, whether to prevent or advance the exfoliation. We cannot, however, conclude from it, that this operation is to be intirely rejected; for its effect in both cases depends on the small granulations of flesh which it procures. Now, these granulations are not imaginary, but proved by the observation of M. *Tursan*, and the testimony of *Beloste*, and other practitioners. This flesh may even arise from the surface of the *cranium*, without piercing it. *Fabricius Hildanus* relates that in a wound, wherein the teguments were loosen'd from the *cranium*, he replaced the divided flesh, and covered the bone with it as well as he possibly could, then dextrously applied dry lint on what remained bare, and dressed the wound, the following days, with a great deal of precaution and quickness. At the end of some days

Certain dressings may hinder the success of the operation.

days he perceived small red spots, which appeared like some small drops of blood. These spots augmented very speedily, and furnished a flesh, which appear'd spongy, and covered the bone in a short time. In order to strengthen this flesh, he sprinkled a desiccative powder upon it. By this practice, the wound, which was very considerable, was cured, without the exfoliation of the denudated bone.

The practice, however, of M. *Boutentuit*, had not the same success. Perhaps, if he had dressed the wound but very seldom, as M. *Beloste* prescribed, the bare part of the bone, which must have been dried by the access of the air, and the too frequent use of spirituous and desiccative remedies, which hinder the appearance of the fleshy granulations, would not have been destroy'd, and the operation would have probably been attended with success.

This dryness of the bone must have also rendered the same operation useless for procuring exfoliation; for the granulations of flesh not having appeared at first, we could not expect that they would sprout forth afterwards, and so push out the piece of bone which was to be exfoliated. We might, on the contrary, imagine that the holes which had been made at first, and long exposed to the influence of the air, must retard the exfoliation, because, by their means, the air was capable of drying the bone more deeply. It was necessary, therefore, when there was more intended than the exfoliation, to repeat the operation, and not remain contented with the first.

The use of the ruginé may also advance exfoliation, when it is retarded by the thickness of the piece of bone which ought to be exfoliated, and which cannot be

Use of the ruginé
in order to procure
exfoliation.

easily pushed out by the growing flesh. We may, in such cases, have recourse to the ruginé, which, however, is not to be used but when the bone is
visibly

visibly altered, and the exfoliation pretty certain; for exfoliation does not always happen, at least sensibly. When, therefore, we perceive, by the obscure or yellowish colour of the bone, and the retardment of the exfoliation, that probably this operation of nature will be considerable, we may accelerate it by the rugin. But we ought not to wait till the piece of bone to be exfoliated is loose, not only because then the operation of nature being far advanced, this method would be useless, but also because we should run a risque of bruising the subjacent flesh, by pressing on the piece of bone, and rudely shaking it by the action of the rugin.

There are cases wherein the piece of bone to be exfoliated is so considerable, that we are obliged to apply several crowns of the trepan hard by each other, and deep in proportion to the suspected thickness of the vitiated bone. This method is to be used, especially in the great exfoliations, which happen to large bones in different parts of the body. These crowns of the trepan make the piece of bone yield more easily to the growing flesh, and the exfoliation is more speedily made.

We have sometimes also recourse to the chisel, in order to remove, by small portions, the piece of bone which ought to be exfoliated, and which nature cannot separate. A woman, who had been trepann'd, came to consult M. *Petit*, more than a year after the operation; the exfoliation was only made on one side of the hole of the trepan. Several surgeons had successively treated this woman, and endeavoured, without success, to procure the rest of the exfoliation. M. *Petit* found the side of the bone which was not exfoliated very black, but perceived no disposition to exfoliation. He, therefore, determined to remove, at different times, this

Use of crowns of the trepan to procure exfoliation.

III. Observation, by M. *Petit*, on an exfoliation, in which it was necessary to use the chisel.

this black part of the bone, by the chisel and mallet, by which means he discovered the cause of the retardment of the exfoliation. The part of the bone, which ought to have been separated, had, on the side of the sound bone, a groove into which the edge of that bone had inserted itself, whilst the piece of the bone was retained before by the edge of the circumference of the bone, which was exfoliated, and in some measure reproduced. Thus this piece of bone was every where too strongly jamm'd to separate of itself, so that M. *Petit's* operation was absolutely necessary. But this operation, and that which consists, as we have said, in applying several crowns of the trepan, require the same attention as when we use the rugine, as was observed before; for if the growing flesh begins to separate the piece which ought to be exfoliated from the body of the bone, we run a risque of mangling it by practising these operations.

C A S E II.

IT is not surprising that bones do not exfoliate in wounds which are not allowed to suppurate, but it is not easy to comprehend why they do not sometimes exfoliate, even in wounds with loss of substance, which suppurate for a long time. Practitioners talk much of an insensible exfoliation in like cases; but there are few who have either believed or observed, that sometimes there is no exfoliation at all.

Bones do not always exfoliate, even after long suppurations.

M. *de la Peyronie* was called to treat a wound of the head, in which the breadth of a *French* farthing, of the superior lateral part of the coronal bone was laid bare; the want of an exfoliation greatly retarded the cure of this wound. M. *de la Peyronie* proposed

IV. Observation, by M. *de la Peyronie*, on the denudation of a bone with suppuration, without a subsequent exfoliation.

the

the operation mentioned in the two first observations, but the patient was frightened at the mention of the trepan. This surgeon, who saw no disposition to exfoliation, and who was willing to see what would happen naturally, did not attempt to determine the patient to this operation, but, on the contrary, assured him that only a little time was necessary, and that he might already look upon himself as cured; so this small wound produced no farther inconvenience than the trouble of covering it any how with lint and a plaister, which was rarely removed. *M. de la Peyronie*, attentive to what should happen to the bone, examined it now and then, and observed that the wound diminished by little and little, that the flesh advanced insensibly upon the bone, and was firmly attached to it. The progress of this flesh was indeed very slow; for this small wound was more than nine months before it closed. The surgeon was not uneasy, because, so long as a denuded bone does not turn carious, and the wound is without any consequence, we may safely wait for the exfoliation. There is an observation of *M. Ruisch*, in which it appears, that in similar cases, the bone

Surface of the bone
sometimes revives
instead of exfolia-
ting.

sometimes revives, in proportion as the flesh approaches; for in the cure which he mentions, there was form'd in the bone, which had long been exposed to the air, and become black, a white circle near the flesh, which advanced to cover it. *M. Robault* relates a similar observation: The exfoliation of a denuded bone, which was become as black as ink, was waited for, in vain, six months. *M. Robault* being desired to dress the wound, discarded the use of tents, which had been forcibly thrust into the wound, and permitted the flesh to sprout up. There was formed, as in the preceding case, a white circle about the circumference of the wound; this circle daily approached more and more to the center,
in

in proportion as the flesh grew, and the wound was entirely closed up in a month, without any appearance of exfoliation.

We have seen in the article on the multiplicity of trepans, in the eighth observation, communicated by M. *Chauvin*, that a bone internally denudated did not exfoliate, at least sensibly, tho' a great extent of it had been laid bare, and tho' it had been kept moist by a purulent matter during the whole cure.

The same thing happened to a young man whom M. *de la Peyronie* trepann'd at *Fontainebleau* : He received a kick from a horse, on the anterior and superior temporal muscle. M. *de la Peyronie* was obliged to remove a part of that muscle, in order to lay bare a fracture, of which a considerable splinter had entered into the substance of the brain. There was perceived, during the cure, a discharge of purulent matter, from a sinus under the coronal bone. This sinus extended over the *os ethmoides*, and the matter which stagnated in it occasioned an oedematous emphysema of the whole countenance, and even of the hands. M. *de la Peyronie* thought that he should be obliged to apply a crown of the trepan, about the middle of the forehead, beyond the superciliary sinus, in order to procure, by this counter-aperture, an easy discharge to the stagnant matter. However, he judged it expedient to try injections and a proper situation, in order to avoid this operation, if it was possible. This expedient succeeded, the matter was evacuated, the bone that was bare internally, and touched by the purulent matter which came from the sinus, did not exfoliate, and the flesh arising from the *dura mater* and brain adher'd to it, and covered it.

V. Observation, by M. *de la Peyronie*, on the same subject.

Wound of the temporal muscle with fracture and lesion of the brain.

What is still more surprising, with respect to this subject, is, that some-

Injections for a wound of the brain.

times

times there has appeared no exfoliation in carious bones, but they have been covered with a laudable flesh, which has procured a perfect cure. *Fabricius Hildanus* informs us that he treated a young girl labouring under an ulcer with caries, which succeeded the small-pox: This ulcer was perfectly consolidated, tho' no exfoliation was perceived. It is not, however, to be doubted, but the vitiated part of the bone was insensibly carried off by the supuration.

A good practitioner may easily distinguish the cases in which there is an insensible exfoliation, from those in which there is no exfoliation at all; for in the last case the lips of the wound by little and little come over the bone, and the surface of this bone, which is not as yet covered, remains smooth, till the lips of the flesh advance to cover it entirely. But when the bone exfoliates, the flesh comes out of the surface of the bone itself; and it is this flesh which protrudes the surface of the bone to be exfoliated either sensibly or insensibly.

All these facts present young surgeons with different objects. They may here observe
 RESULT. the various operations which art can furnish, in order to assist difficult exfoliations. They hence learn not always to expect an exfoliation, at least of the sensible kind, and not unseasonably to torment nature in order to obtain it, unless the long time the bone requires before it is covered, should render it necessary to procure an exfoliation. The young surgeon may also learn from these observations, that an exfoliation may appear not to be making, because the adjacent flesh seems to approach to cover the bone, whilst this flesh, in advancing, secures the piece which ought to be exfoliated, as we have seen in the observation of *M. Boutentuit*. Thus, this flesh becomes an obstacle to the exfoliation, and retards the cure, for which reason we
 must

must attentively consider, whether the lips of the wound, which advance upon the bone, adhere to it in proportion as they grow. Besides, we know that when a scale of bone is to be exfoliated, the flesh which protrudes it below, shakes it by little and little, and afterwards renders it loose; in which case the exfoliation is certain, and we ought, without hesitation, to disengage the lips of the wound, if they adhere to, and retain the piece which ought to be separated. In the third observation, communicated by M. *Petit*, we have seen an exfoliation hinder'd, by an obstacle that is not very common, and which shews us how careful we ought to be, in extremely long exfoliations, to examine if the retardment depends not on some particular obstacle which we do not perceive. Besides the operations we have proposed for the advancement of exfoliation, such as the perforative trepan, rugines, crowns of trepans, and the chisel, it is sometimes necessary to have recourse to another method; for if the part of the denudated bone changes, and becomes carious, or bedewed with a putrid sanies, that hinders the production of flesh, by which the exfoliation might be made, desiccative remedies, and even powder of euphorbium, are not always sufficient to dry the caries; in which cases we are obliged to apply the actual cautery, which is the surest and most efficacious means, both of stopping the caries, and hastening the exfoliation.

MEMOIR VI. By M. PETIT.

Description of a new Elevator, with Reflections on those hitherto used.

IN wounds of the head, accompanied with fracture and depression, it is sufficiently known of how great importance it is to raise those bones, which either wound or compress the *dura mater* and brain, to that level which they were naturally in. We also know the different instruments which have been invented to perform this operation, which, in a moment, may change the fate of the patient, and, as it were, recall him from death to life. But, as practice has enabled me to discover several defects in these instruments, I thought it expedient to enumerate these defects, and, at the same time, propose a new elevator, which, in my opinion, is free from them.

The instruments hitherto used to raise the bones of the *cranium* depressed on the *dura mater*, are, principally, the *common elevator*, the *claw*, or the *griffin's foot*, and the *triploid*, with or without the *terebra*, and sometimes the *terebra* alone.

We use elevators, the griffin's-foot, or the claw, only as levers, which require both a fulcrum or point to move upon, and a moving force. Every one knows, that this fulcrum or point is either in the hand of the operator, or on the neighbourhood of the bone which is to be raised.

In the former case, that is, when the hand which is the moving force, serves at the same time as a fulcrum or support to the lever, the end of the thumb keeps the elevator secured against the middle of the fore-finger. The long branch of the lever is inclosed in the palm of the hand by the other fingers, and by the *thenar*, a muscle commonly called *abductor*

abductor pollicis manus. This pressing on the extremity of the long branch of the lever, communicates to it all the force which it receives from the hand, and which the hand receives from the arm. This makes the long branch sink or subside, whilst by the same means the short branch under the depressed bone is raised.

I am sensible, that in performing thus, the operator has a great deal of strength, but the hand not having a necessary command and firmness shakes, and the end of the elevator may escape. This accident would shake all the *cranium*, and produce a kind of stunning or commotion, which must necessarily be avoided.

In the second case, that is, when we support the elevator, the griffin's-foot, or any other lever of a similar nature, on the bone adjacent to that which is to be raised, I own that the lever is better secur'd, but, at the same time, we run a risque of depressing the bone on which it rests, without raising that which is depressed.

The force of the triploid is much greater than that of the rest of the levers; but it is not for this reason preferable to them. The resistance of depressed bones is not so great, but it may be surmounted by a force less considerable than that of the triploid.

This instrument has three feet or branches like a tripod. These rest on three points at a small distance from the circumference of the wound, and as these branches are at an equal distance from each other, the whole of the wound is under the vault or arch formed by them.

The moving force is applied to a nut, which receives the screw of the upper end of an upright shaft, the lower part of which passes to the center of the arch. This lower part has its extremity bended in form of a hook, which is introduced under

the bone to be raised ; so that by turning the nut to the right, the screw is gradually raised. Thus the hook raises the depressed bone under which it is introduced, with all that force of which a screw is capable.

This is the method of using the triploid alone: But it is necessary that there should be a hole in the *cranium*, and that this hole should be sufficiently large, for the introduction of the hook under the depressed piece. This only happens when there are large fractures of the bone with loss of substance, or when a crown of the trepan has been previously applied. When, on the contrary, there is no means of introducing the hook of the triploid, we make a hole, with the perforating trepan, in the piece of the bone we intend to raise. In this hole we engage a very short terebra, and after having passed the hook of the triploid into the handle of the terebra, we turn the nut, the screw mounts, and raises at once the terebra and the depressed piece of bone. These are the two methods of using the triploid, that is to say, either with or without the terebra.

The inventor of the triploid has been very sensible of the defects of the griffin's-foot, and of the other elevators. These he has endeavoured to remedy by the three branches, which, being placed at a great distance from the fractured bones, run no risque of depressing them, which, as before observed, the common elevators may do, when they are supported on the brink of a fracture. This kind of triploid being fixed, and its hook securely engaged under the bone, cannot slip, as the common elevator frequently does, when it has no other support than the fore-finger of the hand which moves it. But, notwithstanding all these advantages of the triploid, above the other elevators, it must be own'd that it has a great many defects.

1. It is difficult to find three points where we can fix it without producing pain, and very often we cannot find so much as one point, because the parts adjacent to the wound are bruised, inflated, or painful.

2. This instrument must be applied in such a manner, as that the center of the arch may be directly opposite to the depressed bone, whether to engage the hook under it, or to fix the terebra in it. Besides, if we have not justly taken the measures necessary, and which are very difficult to be taken on such occasions, we are obliged to unturn the screw, in order to find the right point.

3. It is not only sufficient to have found this point, but we must also introduce the hook under the bone, which is a very difficult task ; for if we vary but a line, or twelfth part of an inch, from the proper place, we are obliged to remove the three branches.

4. We can only use the hook in cases where there are great apertures in the *cranium*, because this hook has a certain length, which is necessary, in order to its taking hold under the depressed bone, and because this length requires an aperture greater than the length of the hook, which must, by no means, be entered forcibly.

5. One of the greatest defects of the triploid is, that, in order to apply it with the terebra, we are, with the perforator, previously obliged to make a hole in the depressed bone, which may, by this means, be possibly still more and more depressed.

6. This instrument is of so compound a structure, that it can hardly be used except by operators of great dexterity ; whereas, it were to be wished that surgical operations were rendered as simple as possible, that they might be performed in country places as well as in cities. In a word, the great st of our modern practitioners are so fully convinced of

the uselessness of the triploid, that few of them have it except to adorn their surgeries.

The reflections which practice has enabled me to make on the defects of the instruments before-mentioned, have also induced me to contrive an elevator, by means of which we may avoid the long, difficult and dangerous operation, which is almost insupportable from the triploid, the griffin's-foot, and all the other elevators hitherto used.

It must, therefore, be allow'd, that the principal thing in this operation, is to find on the *cranium* a support for the lever, as near as possibly may be to the bone to be raised, and that this support may be on a solid plane, that so, without breaking, it may sustain the effort made in raising the depression.

With this view I have ordered a kind of bridge to be made, in order to serve as a
A new elevator. support or fulcrum to the lever, since, by this means, the hand of the surgeon is no more than the moving force, and since this force does not require to be so great by far, as when the hand is at once the support of the lever, and the force which moves it.

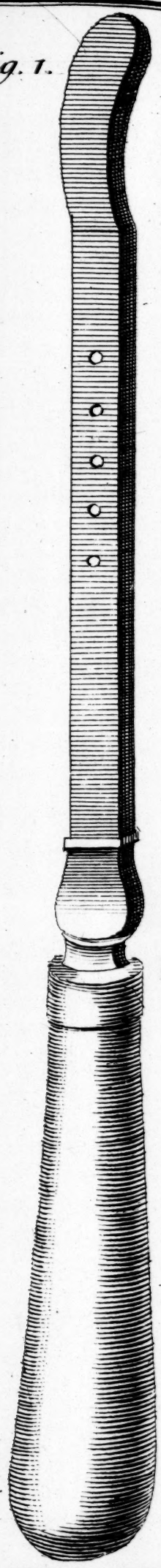
The operation performed by this instrument, is neither so long nor perplexing as that of the triploid. Besides, we can give it as much force as we please, and it has all the justness and accuracy which are either wanting, or very difficult to be found, in the other instruments. It is made in the following manner :

This elevator is composed of two principal parts, namely, a lever, and a kind of bridge, which screws as a support to it.

The lever is about eight inches long, about five lines broad, and about two lines thick. The whole of it is strait, except a small incurvation at the extremity of the short branch of the lever. This part is narrower, thinner, and flatter than the rest, that

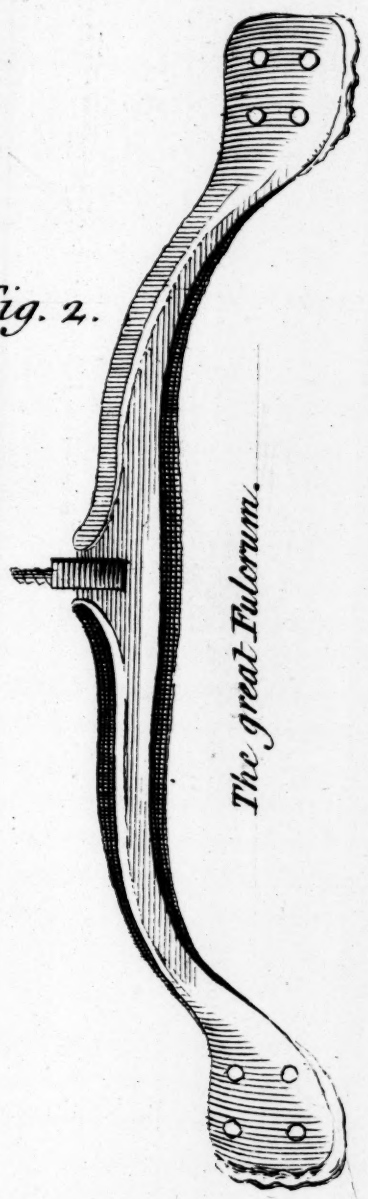


Fig. 1.



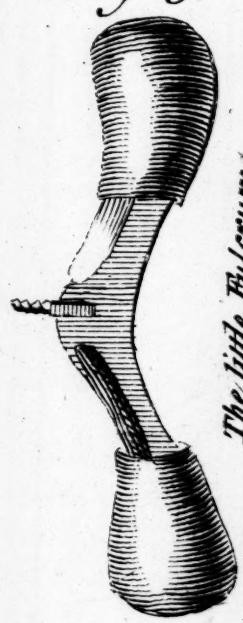
The Levator.

Fig. 2.



The great Fulcrum.

Fig. 3.



The little Fulcrum.

Fig. 4.



The Levator with its Fulcrum.

it may be the more easily convey'd under the bone to be raised. This end is also cut into several transverse grooves, to hinder it from slipping from under the bone to which it is applied; whereas the under part of this end and its edges are round, and very well polish'd, that it may not wound the *dura mater*.

The other end of this lever, which I call the long branch, is fix'd in a smooth wooden handle, that the hand which conducts it may not be incommoded by it. The surface of the under part of the lever has several holes in its middle made length-ways: These holes, which are wormed, are about two lines distant from each other, and serve to receive a screw, which bounds and fixes the lever's fulcrum or point of rest, and this screw may be equally fixed in each of these different holes. The number of these holes, disposed in the manner we have mentioned, renders it easy to make the fulcrum nearer or farther distant, and consequently to give the lever more or less force, as we shall afterwards shew.

The second part of the elevator, and that which I look upon as essential, is a kind of bridge, on which the lever is to be supported. It resembles the bridge of a violin, and comes still nearer to that generally used by carpenters and some other tradesmen.

The part of this bridge which is applied to the *cranium* is arched, that it may only touch by its two legs or extremities.

These two legs ought to have as much surface as possible, not only in order to render the support of the lever more stable, but also that the effort which the bone must sustain, may be divided on a greater extent of its surface. These extremities are covered with shamoy-leather, both to hinder them from slipping, and from making any impression on the bone. At the top of the bridge is the screw we have mentioned, which being fixed in the screw-

holes fixes it to the lever. This is necessary, in order to hinder the bridge from slipping under the lever.

It daily happens that when operators, without having taken proper measures, fix the fulcrum of their levers, the resistance of the weight makes the lever change its situation. We may easily judge that such an accident would be a great disadvantage in our operation. In a word, at the very time we make the elevation of the depressed piece of bone, if the resistance of this piece should be greater than the power of the lever, the fulcrum or point of support would be changed, and the extremity of the lever slipping from under the bone to be raised, this bone would recoil on the *dura mater*, and strike it with a force proportion'd to the suddenness with which the lever slipt from under it.

It was, therefore, necessary to fix the lever to the bridge, but it was also necessary that this joining should permit the lever to move on the fulcrum, without the latter following the motions of the former. This advantage we reap from the screw at the top of the bridge, which, without this circumstance, would have followed the lever in all its motions.

Another advantage we draw from this screw is, that by observing not to screw it to the bottom of the screw-hole, the feet which are fixed give a play to the lever, and permit us to turn it both to the right and left, as upon a pivot, by which means we may place this lever under all the different parts which require elevation, without being obliged to change the place of its fulcrum or support.

With respect to those cases where it would be impossible to place the fulcrum or point of support on denudated bones, either on account of the great bruising of the pieces, the small extent of the wound, or the inflation of the flesh, which also diminishes
its

its largeness, I have contrived another bridge, which is longer and higher. We may, in cases of necessity, make it larger; so that its branches are farther from the lips of the wound, that they may not incommode them, and that the surgeon may conveniently perform all the motions necessary to raise all the pieces of the depressed bone.

I have also order'd the screw of this second bridge to be made exactly of the same size with that of the former, so that they may enter the same holes.

By taking these measures, we may have several bridges of different bulks, to be used according to the different cases, which may occur in practice.

MEMOIR VII. By M. QUESNAY.

REMARKS on *Wounds of the Brain*: In which it is proved, by a great many Observations, that the Brain is susceptible of many Operations, which may, in various Cases, preserve the Lives of Patients, together with an Enquiry into the Remedies most proper for the Cure of Wounds in that Organ.

THE brain is formed of a substance so tender, and its functions are in general so important to life, that the least shock or wound seems capable of producing an irreparable disorder in it, and of attacking life in its principle. Notwithstanding this, we have a vast number of observations which fully evince, that wounds of this organ, especially of its cortical and medullary substances, are almost as easily cured, as those of most of the other viscera.

A child, of seven years of age, fell from an eminence of seven or eight feet high, and made a very considerable wound in the right lateral part of the coronal bone, with a fracture, consisting, as it were, of many cracks diverging from a common center. The superciliary sinus was comprehended in this fracture, which extended to the orbit of the eye. There were four segments, whose angles were a little depressed in the substance of the brain, and which, after being raised, left an aperture which render'd the trepan unnecessary. The *dura* and *pia mater* were contused and lacerated to the extent of a silver penny, and a small portion of the brain was protruded thro' this aperture. No bad symptoms

Wounds of the brain cured.

I. Observation, by M. Froumantin, surgeon of Angouleme.

Wound of the brain cured, notwithstanding a very great disorder.

symptoms supervened, notwithstanding the irregularity of the child, who would neither keep his bed, nor observe any regimen. But the wound was so great, that six months elapsed before the patient was entirely cured.

This observation has nothing astonishing, but serves to confirm a great many similar facts related by authors. *Bernard Suevus*, among others, in his treatise concerning the inspection of mortal and curable wounds, printed more than an age ago, collects many cures of this kind from the antients. Before *Bernard Suevus*, *Andreas Crux* had furnished us with a large collection of similar cures performed by former practitioners. The following observations are still more important, since in them we find cures far more astonishing and useful in practice.

A boy, of eight years of age, was struck by a horse on the left side of the head, by which means the parietal bone was wounded in the posterior and superior part. *M. Belair*, being called, attempted to replace the pieces of the bone. But the brain was so much injured below this fracture, that on each motion he made, in order to adjust these fragments, portions of the cortical substance came out, so that during the time he was replacing these pieces of bone, there was more than the bulk of an hen's egg eliminated, *M. Belair* being obliged to depart, left the patient under the care of a surgeon of the town, with whom he conversed on the method of treating the patient, tho', at the same time, he had no hopes of his recovery, so that he was greatly surprised when he heard next year that the child was cured. He was willing to see it, and found it in a state of good health. There was in the part of the wound a small depression, capable of containing a nutmeg. There were

II. Observation, by *M. Belair*, on a fracture with many fragments, and a great contusion, with loss of substance in the brain.

were also inequalities in the cicatrice, but the child's judgment was not in the least affected.

The bones, which were all adjusted, had undoubtedly left interstices, which supplied the place of the trepan, and gave vent to the matter which so large a contusion must have furnished. We must even believe that if the pieces of bone had not left interstices to procure a sufficient evacuation of the matter, which must have been supplied by the suppuration, M. *Belair*, instead of having adjusted these fragments, should at least have removed those which might have opposed the elimination of this matter; for the violent suppurations of which the brain is susceptible are always greatly to be dreaded, and require a great deal of attention in the surgeon. But, however much these great suppurations are to be dreaded, they have often had an happy success, and have, in a particular manner, served to make the force and advantage of the art known. The following observation sufficiently indicates the advantages to be expected from surgery in similar cases.

A large and robust young man, of seventeen years of age, was wounded by a musket-bullet. This bullet, which was discharged from a lower to an higher place, pierced the upper lip, passed thence into the right nostril, and penetrated the arch of the orbit, in order to enter the *cranium*, whence it was discharged at the crown of the head, in the superior part of the coronal near the sagittal suture. It made, in this part, a fracture, which extended to the parietal, and produced in the teguments a great wound, with loss of substance; an inflation, which render'd the head monstrous, supervened. There was first an incision made in the wound of the orbit, from which, on the removal of the first dressing, there was discharged a portion of the two substances of the brain, as large as a small hen's egg, The eye

III. Observation,
by M. *Eagieu*, on
a gun-shot wound
penetrating into
the brain.

eye was become very large, especially the upper eye-lid, in which an incision was made, to give vent to the blood which was thought to be extravasated in it. But, instead of blood, a splinter of bone, and a portion of the two substances of the brain, almost equal to a third of that before evacuated, were discharged. These wounds were softly dressed with pledgets, at first dipt in vulnerary water, and some days after in a digestive, animated with spirit of wine. Venesections, both in the arm and foot, were not forgot; but still some small portion of the brain was evacuated. On the fourth day the suppuration of the substance of this organ began to appear, by a discharge of a pretty fluid matter: On the fifth this discharge was considerable: On the sixth the suppuration became general. After the venesections the patient was pretty well, except on account of his weakness, till the eleventh. On the twelfth his weakness became more considerable: On the thirteenth the matter which flow'd from the brain, and had been copiously discharged, both from the superior and inferior wounds, was, in some measure, retain'd, and the patient fell into a lethargy, and universal listlessness. M. *Bagieu*, who treated the patient, again examined his wounds with great attention; upon which he perceived, in the superior wound, a large piece of loose bone, which he removed without difficulty; but the patient, instead of being relieved by this means, became worse till the fifteenth, when it was thought he would die. M. *Bagieu* observ'd, that in pressing the skin in the part where he had extracted the piece of bone, pus was discharged, which made him suspect that the matter was accumulated in that place. As he was of this opinion, he remov'd the skin, and some portions of the *dura mater*, which retained this matter. This operation restor'd the evacuation of the matter of the suppuration. The pulse was raised, and the patient's

patient's speech return'd next day, after which the suppuration dried up by little and little. On the nineteenth the flesh began to granulate, and the wound in the crown of the head was covered in a short time. The like did not happen to that of the eye-lid ; for there supervened a considerable fungus, occasioned by some splinters detached from the neighbouring bone. But, notwithstanding all the care which was at first taken to cut and consume this fungus, it was necessary to wait till all these splinters were discharged, after which the excrescence was easily destroy'd. The wound was soon closed up, and the patient entirely cured, without any remaining deformity.

We find, in *Valeriola**, an observation of the same kind, tho' it does not appear that in the cure there were such terrible symptoms to be overcome. A soldier received a wound, with a musket-bullet, which passed thro' both temporal bones. Notwithstanding which, he was cured, tho' he remained blind and somewhat deaf. *Rhodius*† also relates the history of a soldier cured of a thrust of a javelin, which entered between his eyes, and came out at the crown of his head. But it is to be observed that there is a great difference between gun-shot wounds, and those produced by simply penetrating instruments : Since *Wepfer*‡, taught by his own experience, thinks that no person can recover of a gun-shot wound when it penetrates deep into the brain. We intend, however, to shew, in speaking of wounds of the brain with extraneous bodies, that there are facts which prove the contrary, as well as those we have related, especially that by M. *Bagieu*, which cannot be called in question, since this cure was performed under the eyes of many skilful surgeons. But what is more surprising in wounds of the brain,

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* Liv. 4. cbs. 10.

† Bonet. biblio. de chir. cent. 1. obs. 72.

‡ Dissertat. de apopl. 228 et 345.

is, that the substance of this organ, which is so soft and delicate, can suffer the presence of considerable extraneous bodies, and even retain them for a long time before they produce any symptoms.

A brigadier, in the *French* service, received a wound with a musket-bullet above the eye-brow. The ball penetrated the bone, and lodg'd itself in the brain.

IV. Observation, by M. *Marechal*, on a ball lodged in the brain.

The patient recovered so well as to return next year to the campaign, where he died, as it is said, by the intense heat. When his head was open'd, the ball was found sunk two finger-breadths into the substance of the brain, where it had remained without producing any disorder.

M. *de la Martiniere* has presented to the academy a grenadier, in whom there remain'd, in the middle inferior part of the coronal, between the two frontal sinuses, a small fistular sinus, caused by a gun-

V. Observation, by M. *de la Martiniere*, on the same subject.

shot wound. The ball had pierced the bone, without making any vent for itself. It had in entering, towards the left side, grazed upon the superciliary sinus, which it had fractur'd: The *dura mater* was also lacerated. During the cure of this wound there were several splinters extracted, which had been detached from the internal table of the coronal. The course of the ball was easily followed by the probe along the sinus, but it was impossible to find it. The patient had, at several intervals, various symptoms, such as a fever, lethargy, and delirium. Those who had the care of him had recourse to venesections, and all other methods of relief. On the twenty-seventh day the patient seem'd out of danger, and then the search of the ball becoming useless, they thought of closing up the wound. The patient was cured, only there remain'd a small sinus, which might probably depend on the superciliary sinus which had been fractured. This soldier is now among

among the invalids, and there has since no symptom happen'd to him which seem'd to be produced by the ball. These observations greatly confirm the facts of this nature, related by various authors ; for instance, that of *Preussius*, concerning a ball, which, at the upper end of the nostrils, enter'd the *cranium*, where it remain'd without proving mortal. *Fabricius Hildanus** has given us the history of a ball, which pierced the coronal, and was lodged in the head. The cure was difficult on account of the fracture it had made in the bone, but it was nevertheless happily terminated. The patient happening to die six months after, and his head being opened, the ball was found near the sagittal future, between the *cranium* and the *dura mater*, which was not injured. *Veslingius*†, in dissecting the brain of a woman publickly, found the end of a dagger with which she had been wounded five years before. Neither did any incommodity remain, except an head-ach every time it rain'd. *Zacutus* || relates that a man had in his brain, for eight years, the half of a knife, without being incommoded by it. *Joannes Dominicus Sala* informs us that he saw a man who received a wound with a sword, of which he was perfectly cured, tho' the point of the sword remained in his brain all his life.

Besides, a great many similar facts, of which we cannot doubt, have happen'd in our own days. Such is the history related by M. *Anel* §, of a ball which broke the coronal bone, and entered the brain. The patient was cured, and the ball for many years remain'd in his head without any incommodity : At last he died suddenly when playing at cards. The surgeons who cured his wound, upon opening his head, found the ball upon the pineal gland, with
newly

* Cent. 2. obs. 2. † Bonet. bibl. chir. cent. 1. obs. 73. || Ibid.

§ Mangot. bibl. chirurg. cranii fracturæ. We also find, in the philosophical transactions, the history of a ball lodged in the substance of the brain for several years, an. 1709. N^o 310. art. 6.

newly extravasated blood, which was coagulated. That end of an arrow, which M. *Majault*, surgeon-major of the hospital of *Doway*, says, remain'd four months in the brain of a soldier who was cured of it, furnishes us with an incontestable fact of this kind, since M. *Brisseau*, physician of the same hospital, M. *de la Fosse*, first surgeon to the queen, and inspector-general of the hospitals, together with several other surgeons, were witnesses of it.

It has often happen'd that splinters or pieces of the *cranium* have remain'd for a long time concealed in the substance of the brain. M. *Manne* relates an example of it: The splinter of which he speaks remained a month fixed in the brain, without producing any troublesome symptoms. M. *Fanton* * saw a portion of the inferior lamina of the frontal bone, which had entered into the substance of the brain of a mason, where it remained for several months, without obliging the patient to discontinue his business.

Hartsoëker †, in order to assure himself that wounds of the brain are not absolutely mortal, for some time fixed a Experiments made on the brain. dog to a table, by driving a nail through his brain, and when the animal was set at liberty he poured *Rhenish* wine into the wound, which was very soon cured, without producing any symptom. *Verdriez*, in the *German Ephemerides*, has given us an experiment nearly similar. But the case is not exactly the same in wounds of the *cerebellum*, for it has been observed, that these almost always prove mortal‡. *Willis* ¶ says, that tho' we cut the whole brain of a dog, neither the motion of the heart nor respiration cease, whereas both these cease as soon as we injure the *cerebellum*. There are, however, many observations which evince that the *cerebellum* has been often found

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* Manget. bibl. chirurg. cranii fracturæ.

† Goëlike hist. chir. p. 325.

‡ Alberti jur. med. P. 1. pag. 317. § 43.
bibl. 4. cap. 1.

¶ De constan. animi

almost all gangrened. M. de la Peyronie found it all destroy'd by an hard tumor, which was formed by little and little, and which was enlarged to such a degree, that there remained no more of the *cerebellum* than a shapeless lamina, which covered the tumor. We also find some examples of wounds of the *cerebellum*, in which the substance of that part has been entirely destroy'd, and yet the patients have survived such wounds several days. M. Goëlike observes that, near the brain, wounds of the spinal marrow are absolutely mortal. He thrust a sharp knife betwixt the first and second vertebræ of a dog's neck, upon which the animal was forthwith seiz'd with convulsive motions, and died. M. de la Peyronie having remark'd, by a great many observations, that the *cerebellum*, the lobes of the brain, the channel'd bodies, the pineal gland, and some others taken in particular, are not absolutely necessary either to life, or to the faculties of the soul, especially to knowledge and judgment, he has been convinced of the falsity of the different opinions entertained concerning the seat of the soul, and discover'd, by all the observations which surgery and anatomy could furnish him with, that, on the contrary, the *corpus callosum* cannot be wounded without disturbing or abolishing these faculties; whence he rationally concludes, that the *corpus callosum* is the part of the brain where the soul exercises her functions †.

The knowledge of all these facts presents surgeons with a particular piece of insight; for not only the cures we have related, but also a great many similar ones, found in the observations of different authors, ought to encourage them to treat wounds in the substance

The brain susceptible of operations.

† M. de la Peyronie has given the academy of sciences a memoir on this subject, which was read at their public meeting, on wednesday after the *quasimodo*, in the year 1741.

stance of the brain, however considerable, with all possible attention, especially when there are any hopes of succeeding. Besides, these facts make surgeons perceive that they may, especially in desperate cases, attempt certain operations on the brain, which are authorised by the danger of the patient, and which the indications in a manner prescribe as the only means of relief; that they may, for instance, open abscesses in the substance of the brain, when symptoms demand it, search for extraneous bodies supposed to be lodged in that organ, remove portions of the substance of the brain when it is mortified, and cut off funguses and carcinomatous tumors to which the brain is subject. The reader is, on this occasion, to consult the abstract of observations on the multiplicity of the trepan, in order to remark that a surgeon may make, in the *cranium*, the various apertures necessary to perform these operations easily.

In order to evince the necessity of these different operations, and enumerate the circumstances which may render them more or less possible or difficult, we shall relate some observations, and make some remarks, sufficient to discover the different cases in which these attempts may be more or less safe and expedient. We shall therefore begin with latent abscesses in the substance of the brain.

Operations of which the brain is susceptible.

In wounds of the head there are particular cases, in which, after having open'd the *cranium*, we are also obliged to make an aperture in the membranes of the brain, in order to discover the cause of the symptoms which remain after the operation of the trepan. This operation is not always sufficient, and these symptoms are often supported by a suppuration, happening in the substance of the brain, and very frequently opposite to the fracture which rendered the trepan necessary. This suppuration forms

abscesses, which discover themselves by no external sign; neither can we be determined, except by the violence of the symptoms, to make an aperture in the substance of the brain, in order to give vent to the matter of the abscess supposed to be the cause of these symptoms. But the uncertainty of success has always been more than a ballance for these conjectures: Surgeons, for fear of risking their reputation too much, choose rather to let the patient die, than make such attempts. Our dread, however, of opening the brain, may be compared with that of the antients in making an aperture in the *dura mater*, which at present is opened without any hesitation, and this operation has preserved the lives of an infinite number of patients. Perhaps succeeding practitioners will be surpriz'd at our timidity in opening the substance of the brain. We have already a great many facts which upbraid us with this cowardice, and which ought, in desperate cases, powerfully to induce us to venture on the operation we now propose.

A child, in consequence of a fall on the left parietal bone, was seized with symptoms which indicated the necessity of the trepan. This operation gave

VI. Observation by
M. de la Peyronie.

vent to a considerable extravasation made on the *dura mater*. This membrane was in a laudable state, and the symptoms disappeared till the 28th day, when the patient was seized with

Abcess of the
brain, which might
have been opened
at the aperture of
the trepan.

convulsions, a kind of palsy of the right side, a lethargy, and an almost continual loss of sense. M. de la

Peyronie opened the *dura mater*, suspecting that there was, under it, an abscess, which occasioned these symptoms; for otherwise there were no particular signs which could assure him of this circumstance, neither did he find any thing below this membrane. The imminent danger of the
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patient made him think of opening the brain itself, but the attempt being thought too bold, was opposed, and the child died of convulsions. M. *de la Peyronie* open'd the head, where he found, opposite to the aperture of the trepan, an abscess in the substance of the brain, which was only three or four lines in depth. Thus, from the various examples related, it is not to be doubted but the child's life might have been preserved, if M. *de la Peyronie* had ventured on the operation we now recommend.

M. *Bellair* relates an almost similar case. A man about twenty nine years of age received a wound with an halbert, which penetrated about a finger-breadth into the brain. The functions of the soul were not disturbed by this wound, and the patient, after its reception, travelled a long way without any person's assistance. Many pieces of the fractured bone were extracted, and the wound was dressed as in cases of the trepan. Forty four days passed without the appearance of any symptoms, and the patient got out of bed every day; but at the end of this time, he was seiz'd with a fever and shivering, and died in twenty four hours. Upon opening his head, there was a small abscess found in the cortical substance opposite to the wound, and the *dura* and *pia mater* were tense and inflamed.

VII. Observation,
by M. *Bellair*, on
a case similar to
the preceding.

It has often happen'd, that the *dura mater* being opened by a surgeon, or by the blow which inflicts the wound, nature herself has satisfied the indications presented by these abscesses. The following observation, and many others which we could relate, and in which we see that the rupture of similar abscesses has had happy effects, sufficiently evince, that the operation we propose may often succeed happily, if it discovers the abscess.

Apertures of abscesses in the brain.

VIII. Observation by M. *Petit* on an abscess of the brain opened naturally and cured.

A child of nine years of age, by falling on a square stone, lost his senses: M. *Petit* being called, found, two or three finger-breadths below the right eye, a wound sufficient to admit the finger. He perceiv'd that the bone was fractur'd and depress'd, which obliged him to make a crucial incision, sufficiently large to lay bare the whole of the fracture, and procure a proper space for the application of the trepan: he deferr'd the operation till next day, on account of the hemorrhage: almost as soon as he had applied his apparatus, the patient's senses were restor'd, and he was blooded several times. M. *Petit*, upon using the trepan, found no blood extravasated under the *cranium*: he raised the depress'd pieces of bone, remov'd such as were entirely loose, and cut off all the inequalities which could have proved injurious to the *dura mater*. No symptoms happened during the first days, till the night succeeding the fifth, when the patient was seized with a gentle fever, and became restless, hot, and very thirsty, which laid a foundation for venesection next morning: in the evening, his head being heavy, and the fever being augmented, he was blooded in the foot: next day the wound was more dry than usual, and the *dura mater* appearing somewhat brown and prominent, resisted the touch, whence M. *Petit* suspected that there was some liquor extravasated under it. He had hardly opened this membrane with a lancet, till a spoonful of brown and fetid serum was discharged from an abscess formed in the substance of the brain: he augmented the aperture as much as possible, but the first evacuation did not dissipate the symptoms, because the patient was very much agitated next night. He was delirious, and gnashed his teeth frequently: his pulse was hard and in-

intercadent : in the morning, however, the dressing was very moist ; the lethargy was considerable in the evening, and during the whole night : next day, which was the eleventh from the reception of the wound, all these terrible symptoms disappeared : M. *Petit*, upon dressing the patient, perceived the cause of so sudden a change, for he found the apparatus full of a very fetid pus. There were some flakes of the substance of the brain afterwards discharged : those portions of the membranes which were mortified, were detached, and the patient was perfectly cured at the end of two months. We shall afterwards relate an observation of M. *de la Peyronie* on the same subject, whose success was also very happy.

Though in Observators we find a great many similar abscesses, yet it is to be remarked, that they are not always situated advantageously for the operation ; for sometimes they are found near the ventricles, and even sometimes in the part opposite to the blow ; so that when the blow has been on the superiour part of the head, the abscess may be situated near the base of the *cranium*. Of this we have an example in *Pigray**, who gives us an account of a very small abscess, which did not prove mortal till six months after the reception of the wound.

Remark on abscesses of the substance of the brain produced by a counter-blow.

When abscesses are formed in the part opposite to the blow, they generally produce some symptoms which may lay a foundation for making us suspect them. We have already seen, under the article of the trepan, in dubious cases, that many practitioners have with success trepann'd in the part opposite to the wound. If when we trepan in the part where we suspect a counter-blow, and find nothing either under the *cranium* or membranes of

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* Liv. 4. Chap. 9.

the brain, and if the symptoms which induced us to perform the operation, persist after the trepan, we may conjecture that there is, in this part, a latent abscess in the substance of the brain.

The symptoms which lay a foundation for suspecting a counter-blow, and from which we are induced to trepan, are principally a fixed pain, which, though not perceived at the part of the blow, nevertheless seems to be a consequence of it. If irregular shiverings, a fever, and other symptoms supervene, we may presume that an abscess is formed in the part of this pain.

The palsy, which often happens in similar cases, and which is generally found on the side opposite to the part of the brain which produces it, may, in conjunction with the pain, greatly contribute to determine the seat of the abscess; for if the palsy seizes the arm, the leg, or any other part on the side of the blow, we are almost sure that the disorder is on the opposite side. We have, however, some examples of palsies, whose cause is found in the brain on the same side with these palsies themselves. But we ought not to confine ourselves to these particular cases, unless they discover themselves manifestly. Thus when the palsy is accompanied with dangerous symptoms, we may trepan in the opposite side; and if we discover nothing, either under the *cranium* or the membranes of the brain, we may venture to make some small incisions in the substance of that organ, in order to assure ourselves, whether there is not in the cortical substance, and even beyond it, some abscess which may be the cause of these symptoms. Such an incision is not to be dreaded, in order to save the life of the patient; and if this end is not obtained, the abscess will prove mortal independently of the incision. Neither is this practice to be dreaded with respect to the pain, since we have of-

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ten observed that the proper substance of the brain is insensible.

Carcinomatous tumors which happen to the brain, and which are always fatal to the patient, no less deserve the attention of the surgeon than the abscesses of which we have been speaking; for the intolerable pain they cause, and which only ends with death, renders them insupportable, and the attempts to remedy them are useless, because we shall shew, in the following observation, that we almost never discover this disorder till it has proved mortal.

Extirpation of carcinomatous tumors of the brain.

A man was afflicted with a violent and continual head-ach, which supervened a blow on the head, to which he paid no attention. This pain, notwithstanding all the remedies used, persisted till the patient's death, after which there was found a carcinomatous tumor, as large as a hen's egg, which was formed in the substance of the brain. There are many examples of these terrible tumors, to be met with in the works of practitioners*. It seems, however, that the extirpation of these tumors is not always impossible, especially when they are of a small bulk, and situated on the surface of the brain; for the brain may sustain similar operations, since it often resists very considerable wounds and gangrenes. These tumors are not generally so large as that we have now mentioned. We have seen before, in the twentieth observation, the history of a long and violent head-ach, produced by two carcinomatous tumors, which were not much larger than a pea, and which adher'd to the cortical substance of the brain. Now if in an intolerable head-ach, whose event seems greatly to be dreaded, we should either suspect or discover a
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IX. Observation by M. Cogblan, on a carcinomatous tumor of the brain.

*Ephem. Dec. 2, an. 1. obs. 167. Bonet, Sepulcr. Plater. Lib. 1. Fabr. Hild. op. chir. &c.

similar cause, it would be reasonable to attempt the extirpation of the tumor, rather than cruelly abandon the patient to death, in a case where the operation is infinitely less to be dreaded than the disorder. We may conceive the same notions of the funguses which happen to the brain, as we do of these tumors, with respect to the extirpation.

Art furnishes us with the same expedient against gangrenes of the brain; but, unfortunately, these are often found in the case of tumors, which are only discovered after death.

Amputation of a gangrened portion of the substance of the brain.

A woman of twenty two years of age struck herself against a wall on the middle and superior part of the parietal bone; the blow was not succeeded by considerable symptoms, neither did the patient speak of her misfortune till some days after. She was ordered to be blooded, and use vulneraries only by way of precaution: she was two months and an half without perceiving any other incommmodity than a small pain in the hinder part of the head. But at last she was seized with a fever, and a pain of the whole head and abdomen. M. Sauré being called, examined her head, but found nothing externally: he ordered fomentations and venesection, by which means the pains were dissipated in ten or twelve days; but they soon appeared again, and continued till her death, which happened four months after the reception of the wound. The head being opened, there was neither any fracture in the cranium, nor any extravasation on the membranes of the brain; but about three finger-breadths of these membranes had a livid colour, and when they were rais'd it was found that the substance of the brain was very black and gangrenous, to the depth of three finger-breadths. In wounds of the head where the *cranium* is open, or when

X. Observation by M. Sauré, on a gangrene of the brain.

when a violent and fixed pain, succeeding a blow, determines to the trepan, we may perceive these gangrenes, before they have made too great a progress; and in this case we ought not to hesitate to remove all that portion of the brain which is affected with the mortification. *Lamberti**, a celebrated surgeon of *Marseilles*, gives an observation on the same subject, which ought to be related, since it is a very instructive lesson for surgeons.

A young man, of fifteen or sixteen years of age, received a blow with a stone on the middle of the right parietal; the brain was wounded, and the patient next day fell into convulsions on the side of the blow, and into a palsy on the opposite side. These symptoms were accompanied with a fever, a delirium, and a considerable diarrhoea; the substance of the brain became black, and there was applied to it a medicine composed of two portions of spirit of wine, and one of honey of roses; the brain was inflated, and its substance softer than usual, which made it necessary every day to cut the part of this gangrened substance which came out. On the eighteenth day, the patient fell from his bed, and all the substance of the brain, which rose above the aperture of the bone, was by this fall detach'd, and found in the dressing; but the inflation continued to push out the substance of the brain, which was black, and it was cut off every day in proportion as it was protruded. On the thirty-fifth day, the patient drank so as to intoxicate himself, by which means the substance of the brain was more inflated, and bore considerably outwards: the patient being drunk, slipped his hand under the dressing, laid hold of the whole portion of this substance, and tore it away with violence. Next day the brain was found in a better state, almost all the corrupted part of it was removed, and the sur-

* *Comm. sur la Carie, Chap. 5.*

surgeon could see nearly to the *corpus callosum*: a red succeeded the livid colour, all the putrefaction was surmounted, and the patient cured. The palsy however remained, and he even became subject to epileptic fits, but his reason was entirely restored.

We may, therefore, after the example of this patient, entirely fulfil the indication which naturally presents itself in similar cases. The timorous surgeon, who every day cut as much of this gangrene as appeared without the *cranium*, laboured to no purpose: corruption, which easily seizes the substance of the brain when it is gangrened, because this substance is very soft and moist, must have more and more affected the mortified part left; and this mortified and corrupted part left, must have contributed greatly to accelerate the progress of the mortification. Thus there is a good deal of appearance, that the patient would have died, if he had not removed the cause of this progress, by tearing away almost all the portion of his brain which was gangren'd.

We have before given a great many observations, which prove that extraneous bodies may remain for a long time in the brain, without producing the death of the patient. But these observations, by teaching us that the presence of these bodies

Extraction of extraneous substances retained in the substance of the brain.

does not always prove mortal, ought also to induce us to try their extraction, since sooner or later they are almost always fatal to the patient.

These observations also prompt us to make the researches necessary to discover these bodies, when we have reason to suspect, by the symptoms, the instrument, and the state of the fracture in the *cranium*, that any of them are retained or concealed in the substance of the brain.

A lady

A lady, about thirty years of age, went to see some mortars discharged; but one of them bursting, a splinter of it struck the middle lateral right part of the coronal bone. She fell backwards on the pavement without motion, sensation, or pulse; she vomited, and her senses forthwith returned. This splinter had made a contused wound, with loss of substance; there was also a fracture in the *cranium*, with splinters of the bone separated. M. *de Manteville* extracted three of them, each of which was as large as the nail of the finger, and comprehended the two tables; besides this wound, there was a tumor as large as an egg, with fluctuation near the back of the head on the posterior and inferior part of the left parietal. M. *Manteville*, and M. *Desportes*, who was called into consultation, determined that it was necessary to open that tumor; but two other surgeons opposed it, and made a property of the patient, who was then without symptoms. On the ninth day she was seized with a fever, and a delirium superven'd, which was succeeded by a lethargy, and at last by death on the twelfth day. The surgeons of the *Chatelet*, upon opening her, found no extravasation, but only a splinter in the substance of the brain opposite to the wound. By this, we see how much we ought to be upon our guard against extraneous bodies, which may enter into the brain, and especially how attentive we ought to be, in fractures with cracks, to the splinters which may be lodg'd in the substance of the brain.

XI. Observation by M. *Manteville*, on a splinter found in the substance of the brain after death.

The many cures related in the beginning of this article, in order to shew the assistances of surgery in wounds, and other disorders of the brain, ought not so to infatuate surgeons, as to make them forget the danger which accompanies wounds of the

Remarks on the danger of wounds of the brain.

the brain, neglect the great caution which their treatment requires, and fail of circumspection in the prognostic they ought to make of them; for it would not be difficult by other observations to inspire at least as much dread, as those related give hopes of success. But as it is on such occasions more easy to be afraid than to have too much courage, it will be sufficient to relate the following observation, to counter-balance those which might inspire too much boldness; it will also give us occasion of making some remarks on the judgment which is too lightly passed in certain circumstances with respect to wounds of the brain.

A man, who received a blow on the head, had a splinter lodged about a finger-breadth deep in the substance of the brain. This wound forthwith produced very considerable symptoms; M. *Marechal* removed the piece of depressed bone, and dressed the bottom of the wound with Fioraventi's baum, and the external parts of it with a digestive. The patient was blooded six times, and there was the bulk of the yolk of an egg of the substance of the brain discharg'd: the symptoms were almost entirely dissipated, the patient appeared indifferently well, the fever was moderate, and the wound in a hopeful state: the suppuration every day carried off some portions of the substance of the brain, which were of a softer consistence than that discharged first; there was a hole in the brain, sufficient to lodge a tennis ball. On the ninth day M. *Marechal* reached his finger very gently to the bottom of this wound, in order to examine the flesh, which appeared ill-condition'd. He says, the patient forthwith enter'd into such violent convulsions, that he thought he was ready to die; the symptoms caused by this attempt were soon dissipated, but the state of the patient

XII. Observation
by M. *Marechal*,
on a wound with
a mortal suppura-
tion.

tient was not the less deplorable, for he died on the twelfth day. *M. Marechal* has given this observation, in order to advertise young surgeons that the danger is so great in these wounds, with loss of substance by a great suppuration, that he never treated any of them with success. Now such a declaration from a surgeon of so much practice deserves attention, but ought not to frighten us ; for the observations we have related, and a number of others, permit us with reason to hope for a better success.

It is also to be carefully observed, that the danger often depends more on circumstances, than on the wound itself ; the temperament, the country, the care of those who have the management of the

Circumstances
which may aug-
ment the danger.

sick, and the events capable of exciting the passions, often determine the fate of the patient. It has been observed, for instance, that at *Montpellier*, *Marseilles*, and *Avignon*, wounds of the head are more easily cured than at *Florence* and *Paris*. With respect to the passions, there have been patients seen, who have been suddenly cut off by a motion of anger ; and the unexpected arrival of a person, either beloved or hated, has often produc'd the same effect : others have perish'd for one single act of incontinence, whilst others have died at the interview of the person they were in love with : the want of a proper regimen has often as fatal effects. There are still a great many other singularities which may prove equally noxious ; *Fabricius Hildanus* informs us, that one of his patients died because there was too great a noise made near him, and that a fine was exacted of the father for doing so. Authors are full of observations, in which they attribute the death subsequent to wounds of the head, purely to the circumstances which have preceded them.

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We are often deceived by apparent causes.

It is not to be doubted but these foreign causes may often produce the death of patients ; but it is also to be presumed, that, for want of opening carcases, we often attribute to apparent or external causes, that bad success which is really the effect of some cause concealed within ; a splinter, for instance, an abscess within the brain, a suppuration, such as those sometimes formed after blows of the head, in several of the viscera, and especially in the liver, a suppuration retain'd, a gangrene, an inflammation, or an extravasation. Now if any of these latent causes cut a patient unexpectedly off, when some remarkable conjuncture externally furnishes an apparent cause of this unexpected death, we are apt to attribute to this external cause the fatal event which follows, since it is the only sensible cause which appears to have occasioned it.

However, experience may inspire us with some doubt with respect to these external causes, for it is certain they have not always so bad effects. Observators furnish us with a great many facts on this subject, which seem to render these causes somewhat suspected. *Salmuth** has, among others, related, that a man who had a very considerable wound in the brain was cured, though he was often drunk, and kept company with loose women, who diverted him at least by their gaiety and free conversation. Two things have induced us to quote this observation, or some other similar one : 1. That we may have an occasion to warn young surgeons, who may find similar observations in authors, not to allow themselves to be prejudiced by these bad examples, for fear of becoming negligent with respect to the precautions necessary to be taken in order to prevent these disorders ; for, notwithstanding these ob-

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* Bonet, bibl. chir. cent. 5. obs. 26.

servations, which are truly extraordinary, it is not to be doubted but such deviations are capable of preventing our success in the cure of these great wounds. 2. We have a design to render surgeons careful not to allow themselves to be deceived with respect to the cause of the terrible events which happen in these wounds, and which are attributed to accidental and exterior causes, whilst sometimes, for want of carefully examining the wounds and parts adjacent, we do not perceive the causes, which we might perhaps remove, and which nevertheless carry off the patient, without our so much as suspecting their existence. We could quote a great many observations, in which the aperture of carcasses has discovered such latent causes, as have only proved fatal because they were unknown to the surgeon.

M. *Marechal* has communicated to us an observation, which furnishes us with an opportunity of pointing out a mistake of another kind; it is indeed less dangerous than those we have mentioned, but which is not less shameful to the surgeon who falls into it, and who is afterwards surpriz'd at his error. The substance of the brain is so soft, that the matter furnished by wounds of the head may sometimes have a colour and consistence like those of the substance of the brain, and make it thought that the wound penetrates into this organ when it is no ways injur'd.

A man received a blow on the inferior part of his forehead, which made a wound that penetrated into the superciliary sinus. This wound, after the second dressing, furnished flakes of a mucous matter, which the surgeon took for portions of the substance of the brain. M. *Marechal* discovered, that the wound did not pass beyond this sinus, and that

XIII. Observation
by M. *Marechal*,
on wounds of the
superciliary sinus,
in which a mucous
matter was taken
for the substance
of the brain.

the surgeon had taken the matter filtrated in this sinus, for the substance of the brain. No doubt such mistakes induced *Muys* and *Nuck* to say, that wounds of the superciliary sinus so impose on surgeons, that they often believe the brain to be considerably wounded, when only the external table of the sinus is fractured. The membrane which lines the sinus may by respiration receive a motion which imitates that of the membranes of the brain, which may also concur to make it believed that these wounds penetrate through all the thickness of the *cranium*, when they only reach to the membrane of this sinus. The wound mentioned by *M. Marechal* was very soon cured. This circum-

Remark concerning the trepan on the superciliary sinus.

stance engages us to conclude with a small remark, somewhat foreign to our subject; but which we could not well omit; and this it is, that such a speedy cure evidently proves, that wounds of the superciliary sinuses are not so obstinate and difficult to be closed as is represented by authors, who partly for this reason forbid the application of the trepan upon them. But though it must be granted that this place is not proper for such an operation, yet if any disorder of those sinuses themselves*, or any other circumstances require it, the difficulty of closing the wound ought not to hinder us from trepanning on that part.

II.

We see, from the observations of the greatest masters, that we are but little fixed with respect to the remedies which ought to be employed in wounds of the brain, and that we have but little examin-

Remarks on the choice of remedies proper for wounds of the brain.

* For example, in the case of that cephalalæa mentioned by *Bartholin*, which was caused by small stones retained in one of these sinuses. There are also sometimes worms found in them, which produce the same disorder.

examined what those are which must agree best in such cases. In the disquisitions of this kind, no mention is made of the particular indications which may be drawn from the proper substance of this organ: some have used vinous spirits, and even spirit of wine itself; and others spirituous baums impregnated with ethereal oils, and alcolized or vinous oils: some have employed the honey or syrup of roses, and others the tinctures of myrrh and aloes: some have had recourse to ethereal oils alone, such as the oil of turpentine, whilst others use oil of olives, with *St John's wort*, or some other vulnerary plant infused in it; and some have retain'd dry lint alone. None of these practitioners can render a reason for his preferring one remedy to another. It must however be confessed, that the brain has been looked upon as a spermatic or exsanguine part, and that the remedies most proper to a part of this kind, especially a nervous part, have been appropriated to it. But there is an inconvenience to which the brain is subject, which may be easily remarked, and to which we ought to be very attentive in wounds of that organ with supuration; this is, an inflation of the substance of the brain, which is difficult to repress, and by which this substance tends to discharge itself in suppuration. *M. Marechal* and other great practitioners have often remarked this inconvenience, and it has been observed, that spirit of wine, though often employed with success in wounds of the nerves, may contribute a great deal to this symptom. *M. de la Peyronie* has given an observation on this subject, and experiments, wherein we very sensibly perceive the troublesome effects of these inflations, and the remedies most proper to oppose them.

Inconvenience
which happens in
wounds of the
brain.

A young man, of sixteen or seventeen years of age, was struck with a stone, which made a wound with fracture and splinters in the middle of the left parietal bone. He was trepan'd, in order to remove the splinters which wounded the membranes of the brain: An abscess under these membranes superven'd. M. de la Peyronie, who pierced this abscess, perceived that the matter had, in some measure, insinuated itself into the anfractuosities of the brain, and that it had made some impression on the substance of that organ; for, he there observed already some appearance of putrefaction. He thought it proper to apply spirit of wine to this part, as a remedy proper to resist the putrefaction; but at the end of two days there supervened an inflation, which rose above the aperture of the *cranium* externally, notwithstanding the dressing which opposed it. This inflation was accompanied with so prodigious a discharge of matter, or a suppuration, that it cut off the patient in a few days. It appeared, by the quantity of matter discharg'd, that half of the brain had been evacuated in form of soup during this suppuration. M. de la Peyronie, upon opening the head, was surpris'd to find that the loss of the substance of the brain did not nearly correspond to that which had been discharged. From this he understood that the substance of the brain had been far from furnishing the whole matter of this great suppuration, and that the juices which moisten it had formed the greatest part of the matter.

M. de la Peyronie having frequently observed that spirit of wine had not succeed-
ed in these inflations, or rather sup-
purations, of the brain, and that, on
the contrary, this liquor appeared to
excite them more, judg'd it proper

Experiments on
the properties of
medicines general-
ly employed in
wounds of the
brain.

to make the following experiments, in order to resolve his own doubts, and to discover the kind of remedies most proper to repress these inflations. He put one portion of the brain in spirit of wine, another in wine, another in the baum of *Fioraventi*, another in oil of turpentine, and another in the *commanders* balsam. That in the spirit of wine was rarefied, and rendered considerably more tender: It also, afterwards, corrupted sooner than the others. The same changes also happened to that in the wine, but they were much less considerable. The portion, on the contrary, in the baum of *Fioraventi*, became a little more close and firm. This last effect was still more sensible in those portions which were in the oil of turpentine and the *commanders* balsam.

These experiments sufficiently evince, that essential balsamic oils are preferable to alcoholiz'd oils, in order to repress and prevent these suppurations of the brain. *M. de la Peyronie* has since observed that practice perfectly with these experiments.

Honey of roses is also a very common remedy in wounds of the brain, and it has been long authoriz'd by practice, in cases where a detersion is necessary, especially when the suppuration is obstinate, and the matter of it thick. Some practitioners have looked upon it as a remedy too hot and acrid for this part, but *Scultetus** has destroy'd this prejudice by experience. *M. de la Peyronie* used this remedy very advantageously in making injections into the brain, for which reason we shall relate this cure, very succinctly, because it is already described at length by some authors.

This observation, so famous, as well on account of the greatness of the disease, as the singularity of the cure, includes the history of a wound on the left pa-

Prodigious suppuration of the brain cured by injection.

rietal,

O 3

* *Arten. de chir. page 127.*

rietal, for which M. *de la Peyronie* was not called at first. The patient had laboured under it more than a month, before he saw it for the first time: the symptoms which had supervened some days before, and which had laid a foundation for calling M. *de la Peyronie*, made him suspect an extravasation under the *cranium*. He examin'd the bone, and discover'd a fracture, with many cracks diverging from a common center: next day, he applied two crowns of a trepan, and removed the pieces of bone which wounded the *dura mater*. This operation did not remove the symptoms, and the *dura mater* was a little soft and livid, which determined M. *de la Peyronie* to open that membrane. There was forthwith discharg'd, from the aperture, about a porringer full of ill-condition'd pus, in which were perceived some flakes of the substance of the brain. It was also found, that the cavity in which this pus was lodged, extended to the *corpus callosum*, and was capable of containing a hen's egg. The matter which continued to suppurate, was very pinguious and thick. M. *de la Peyronie* judged it proper to dilute and remove it, in order to make injections into the cavity with honey of roses, diluted with a decoction of cephalic plants. This cavity was so considerable, as to contain four ounces of the injected liquor; in proportion as the cavity was filled with the injection, the patient lost his senses, and appeared to be dead, but his life was forthwith restored by removing the liquor. These injections carried off, with the purulent matter, small portions of the substance of the brain, which went into suppuration. The great advantage arising from these injections, was to hinder the matter from continuing there, and acquiring, by stagnation, a putrid character, which would have entertained and augmented those putrid suppurations, till the patient had died; whereas, by
these

these injections, the suppuration assum'd a laudable character, and the patient was cured in less than two months. *M. de la Peyronie* has in similar cases often employed injections with the same success. If the matter had appeared affected with a putrid dissolution, and if the substance of the brain had greatly partaken of this dissolution, it would have been necessary to have added the *commanders* balsam, the oil of turpentine, or some other balsamic and spirituous substances, to the injections. The injections must neither be thrown in with force, nor through too small a syphon; on the contrary, the pipe through which they are conveyed ought to be large and terminated, like that of a water-pot, that the liquor may extend itself farther, wash better, and make a smaller effort on the substance of the brain. When there is neither tenacity nor dissolution in the suppurating matter, we may use the baum of *Fioraventi*, either alone, or mixed with honey of roses diluted in some vulnerary liquor. We have a great many observations, in which we find that this preparation has been successfully used in wounds of the brain. Those injections which are only made between the *cranium* and *dura mater* require less circumspection, since in a similar case we find that *Paré** with success used decoctions of detestive plants.

* Lib. 10. Cap. 21.

MEMOIR VIII. By M. de la PEYRONIE.

*Observations, with Reflections, on the Cure of
Hernias with Gangrene.*

SURGEONS have recourse to different methods of preventing the fatal effects of hernias with gangrene, but this part of practice is not reduced into method, since every one confines himself to the method which his genius inspires. The authors who describe manual operations, do not always foresee the indications which present themselves in extraordinary cases, neither do they perceive all the means of relief, which these indications may suggest to the patient. Such singularities can only be at first communicated by practitioners, who have observed them, and had recourse to particular means which have succeeded with them. In a word, without the observations which have been communicated to the academy, and which shall be related in another *memoir*, we should be almost entirely ignorant of the happy attempts which many great practitioners have made in hernias with mortification, in order to stop the progress of the putrefaction, retain the gangren'd part of the intestine without, and procure the adherence necessary for the success of the operation. These attempts would, for the most part, be as much unknown to us, as those the antient surgeons made, with the same success, in the same circumstances; for it seems, that the singular proceedings which depend on the skill of the operator, must have been, at least in some degree, practised by the great surgeons in former ages, and that if there had been societies, as at present, to receive the observations of each of these masters, to make use of them in practice, and to communicate them to the public,

public, we should see that the antient surgery was not so limited as it appears. But be this as it will, these procedures, which have only been known by those who have practised them, can only be looked upon as private discoveries, which have in nothing contributed to the progress of our art, since they have not been transmitted to posterity. Thus we have a right to place, among the class of discoveries which we fix and communicate to the public, a great many points of practice, which are, perhaps, very antient. Such, among others, are the different means we have contrived to restore the gangrened intestine in the operation for hernias with mortification, and procure it the adherence which is necessary for its reunion. The Royal Academy of Sciences, in 1723, speaks of a method which succeeded with me very happily in the operation for an hernia of this kind: I have since had recourse to the same method with like success in a disorder of an almost similar nature: I shall exactly relate the history of the disorder, and of the operation, a detail of which has not as yet been given; I shall afterwards make some remarks on the care to be taken by the patient and surgeon in these hernias, and on the state in which the affected parts ought to be, in order to the success of the cure.

A man of thirty years of age had his right testicle and the spermatic chord very much squeezed by a fall. The inflammation of these parts, the pain, and the fever were violent. He was perfectly cured, except some inflation of the testicle and spermatic chord, which remained much larger than in a natural state. Three years after the intestine fell out of the ringlet on the same side. This descent was perfectly retained by a truss, till the patient was sixty one years of age; then

I. Observation by the author, on the manner of restoring the intestine in hernias with gangrene.

then the intestine began to insinuate itself under the bandage. At the end of two years there was a strangulation, which having not been reduced, was succeeded, after the first symptoms which generally accompany these disorders, with a *mi-serere*, and a gangrene of the intestine. In a few days the gangrene communicated itself to the herniary sack, to the fat and skin, so that all these parts, being opened by the putrefaction, gave vent to the fæces, as it were through a watering-pot. The gangrene had also reached to the testicle and spermatic chord, which had remained tumefied and disorder'd from the first accident, in which, as we have said, they had been violently bruised. To prevent the disorder, which must have caused putrefaction, and which might have been augmented by the matter of every kind which was lodged in the tumor, I open'd this tumor from the ringlet to the bottom of the scrotum. I found the ringlet very much dilated by the intestines and the chord of the testicle. The strangulation, which had produced these symptoms, was relaxed by the gangrene of the intestine. I perceived, with my finger, that it extended above the passage, which induced me, in order to remedy this misfortune, to dilate this passage. I drew out the intestine, which I found gangren'd more than two inches above the ringlet. It came so easily, that I readily perceiv'd that it was not retained by any adherence. I removed all that appeared gangrened, and past hopes of becoming alive. To render myself master of the two ends of the intestine, which might have enter'd the *abdomen*, and produc'd ill effects, I pass'd a needle and thread through the mesentery, and made a fold in that part, to bring the two ends of the intestine together, and secure them opposite to each other. Afterwards in tying the thread, I formed a loop capable of retaining the bundle of parts,

parts, which I wanted to hinder from entering too far into the cavity of the *abdomen*; this favour'd the discharge of the *fæces*, and of the matter furnished by the suppuration.

The spermatic chord and testicle being gangrened, it was necessary to remove them. This I did, notwithstanding the largeness of the chord, which was two inches in diameter at the part where I tied it. I could not tie it above this largeness, because it extended too far into the belly.

I separated the loop which retained the mesentery, from the ligature of the spermatic chord, in order to avoid confounding them in the subsequent dressings. I moisten'd the wound with spirit of turpentine, which I continued to use in the other dressings, dipping dossils and pledgets in it, to be apply'd to the parts where any putrefaction remained; for it is the most powerful remedy I know against all kinds of putrefaction. But it is, particularly, in putrefactions which happen in the *abdomen*, which are by the *fæces* rendered more rapid and difficult to oppose, that this remedy is extremely advantageous, by the efficacy and expedition of its operation, so that it cannot be too much recommended in these putrefactions. I press'd gently on the ligature of the spermatic chord, and, lastly, dress'd the wound where the ends of the intestine were secured. The rest of the wound was dress'd with a flat dressing.

Very soon after the operation, the symptoms were diminished, and the discharges were free and copious. On the twenty-fifth day after the operation, the ligature on the spermatic chord being a little relax'd by the diminution of the chord, and a fungus as large as a hen's egg, which appeared to be carcinomatous, appearing in a short time below the ligature, I cut the former ligature, become useless by its relaxation, made a new one
very

very tight, and remov'd the fungus. This last ligature was separated on the eighth day; then the thread which formed the double of the mesentery was also detached, and the two ends of the intestine adher'd to the internal surface of the ringlet. A few days after, the fæces were divided; a few of them were discharged by the wound, and the rest passed into the inferior part of the intestinal canal, and the patient afterwards went to stool in the ordinary manner, when he managed prudently.

The wound continued to close every day, but more or less according to the regimen. If the patient augmented his nourishment, the wound opened again, and discharged more suppurated matter and fæces; but if he fed sparingly, the wound was dried, and furnished less matter of every kind. In a word, it could not be cured sooner than four months, after the patient had, for about three weeks, reduced himself to a very spare diet, of easy digestion.

Six months after the wound was perfectly cured, the patient, towards the center of the cicatrix, felt pungent pains, which were succeeded by an abscess as large as a filberd, which open'd without the assistance of art. It furnish'd pus in a small quantity, some portions of very moist fæces, and a small pointed bone which the patient had swallowed, and which had no doubt been the cause of this abscess. In the course of two months employed in closing up this small hole, sometimes wind, and sometimes moisture was discharged from it, but the cicatrix formed, remained solid, and stood it for many years.

However, by little and little, there survened, in the part of the cicatrix, a new hernia, of the bulk and figure of a pine-apple, whose base towards the ringlet was very large, in opposition to
ordi-

ordinary hernias. To prevent its being enlarged, the patient wears a bandage, whose cushion is only a parcel of silk folded up flat and quilted, but without that protuberance which the cushions of ordinary have. This new hernia is not the only symptom which superven'd since the small abscess we have mention'd, for the patient is subject to a colic, almost like that spoken of in the history of the Royal Academy of Sciences at *Paris* in the year 1723. This colic proceeds probably from the obstacle the fæces meet in passing through the intestine, somewhat strangled by the cicatrix. This obstacle is still augmented by the flexure which the intestine makes at the place of its adherence with the internal surface of the ringlet, where it always remains fixed. The impression of the excrements on the new and delicate flesh might have, at first, also contributed greatly to the production of this symptom. In a word, we may look upon the acrimony of these excrements, as a determining cause of these excrements, since, very soon after the patient is seized with them, he is obliged to go to stool.

But in these cases it generally happens, that in proportion as a patient uses more solid aliments, or in a larger quantity, the cicatrix is relaxed and extended, as I have frequently observed. The diameter of the intestine is enlarged, the flesh loses its sensibility, and the colics become much shorter, and less painful.

If, in order to obtain a speedy and solid cicatrix, we must, as before observed, reduce the patient to a very small quantity of light food, we ought also, only gradually and slowly, to increase the quantity of aliments for a long time, in order to prevent these colics, and preserve the cicatrix. We ought also, above all things, to guard against

Precautions required in the cure of hernias with gangrene.

indi-

indigestions, which, as we shall see in the following observation, are extremely dangerous in these cases.

A woman, of about twenty-seven years of age, had labour'd about three years under a crural hernia, brought on by the efforts of child-bed labour. There was a strangulation, which the patient concealed for three days, but at last a vomiting and other symptoms obliged her to discover the cause of all

II. Observation
by the author on
an indigestion
which proved
mortal in conse-
quence of an her-
nia with putre-
faction.

these effects. The operation was propos'd to her, and she was twenty-four hours before she agreed to it. At last it was perform'd, though there were but small hopes of success.

As soon as the skin and hernial sack were open'd, it was found that about two inches of the intestine was affected with putrefaction, through which very fluid fæces were discharg'd abundantly. After about a pint and an half of them were evacuated, the patient, who before was in violent pain, was reliev'd. The sack was clean'd, and wash'd with a mixture of wine and aqua vitæ. It was thought sufficient to apply to the gangren'd intestine, a pledget dipt in spirit of turpentine. The rest of the wound was softly dress'd with dry lint, and compresses dipt in wine, animated with aqua vitæ.

Three hours after, it was perceiv'd that the discharge of matter had moisten'd the whole dressing, which was chang'd, and it was even necessary for fifteen days to renew it four or five times a day. At the end of this time, the whole strangulated and gangren'd part of the intestine was detach'd by a suppuration. Though the matter of the intestine continued to be evacuated from the wound, yet the flesh was of a good quality. There was a laudable suppuration established, and the cicatrix began to be form'd. At the end of fifteen days, a part of the fæces was discharg'd in the natural man-

manner, and none of them were any more eliminated through the wound. About a month after they were regularly evacuated, and the cicatrix was soon completed.

The very severe regimen observed by the patient had, no doubt, a great share in this cure, which was neither interrupted nor retarded by any symptom; but two months after a perfect cure, the patient had some indigestions, in consequence of which she was afflicted with very violent colics: at last she had a very considerable indigestion, which was succeeded by vomitings, with violent efforts. In one of these efforts, she felt a very intense pain about the cicatrix of the wound made for the cure of the hernia. Her *abdomen* became more and more painful; at last it became prodigiously ^{he} intense, and the patient died on the second day. On opening the *abdomen*, it was found full of very thin fæces. The extravasation probably began to be made, when the patient felt that intense pain about the cicatrix, and it was six hours in making; from the time she felt the pain, she discharged no fæces by the anus. On searching for the aperture of the intestine through which the extravasated matter had passed, it was found near the ligament of *Fallopian*, where the two portions of the intestine had adher'd and established their communication. The inferior portion had remain'd entire, and continued adherent to the part of the *peritonæum* which lin'd the ligament. The superior portion was torn at the part where it was attach'd to the *peritonæum*, the aperture form'd a kind of mouth, about eight lines in length, and two or three in breadth. This portion of the intestine was very much collapsed.

That

Conditions necessary for the cure of hernias with gangrene.

That the cure of hernias of this kind may succeed, it is necessary that the gangrene of the intestine be confined near the ringlet; for if it reaches internally, it may extend along the intestinal canal, infect the mesentery, and prove mortal, as well as all other internal gangrenes to which no remedy can be applied. It is also to be observed, that the superior branch of the intestine being putrified, it will open, and fill the *abdomen* with fæces, which are known to be very copious on these occasions, because they are accumulated on account of the strangulation, which is sufficient to prove mortal, as we see by the following observation.

A man of thirty-five years of age died of an hernia, whose strangulation happen'd ten years before. Upon ordering his body to be open'd, I found, below the strangulation, about six inches of the ilium gangren'd, without any extravasation in the herniary sack, except about two spoonfuls of a liquor of a dark red colour, and of a very cadaverous smell: about three inches of the inferior portion of the ilium were gangren'd, but the gangrene of its superior branch extended more than a foot into the *abdomen*. About three inches above the ringlet, this branch of the intestine had four or five holes, occasioned by putrefaction. There were in the cavity of the *abdomen*, four or five pints of an extravasated liquor, of an insupportable smell, and as black and thick as coffee. If the operation had been perform'd before the gangrene had seiz'd the intestine, or at least before it had reach'd far above the ringlet, and if in this last case the ends of the intestine had been retain'd, as we have said, the patient's life might have been preserv'd.

It is also necessary, for the perfect success of operations

tations for hernias of this kind, not only that the gangrene has not made, above the ringlet or passage of descent, such a progress that we cannot sufficiently retract the two ends of the intestines to retain all the mortified parts without the *abdomen*, but it is also requisite that each end of the intestine should contract, beyond its gangren'd part, an adherence to the ringlet, or near the ringlet, by which these ends may re-unite, or form a communication, that the fæces may pass from the one to the other, and follow the ordinary road. Now a surgeon is sometimes depriv'd of this advantage, for the means used for facilitating this adherence do not always succeed. If on these occasions the gangren'd part of the intestine separates naturally from that which is sound, or if it is cut off, without the precaution to retain the two portions of the intestine, either one or both of them may return by the spring of the mesentery to which the intestine adheres, or by some other cause; and if these two portions return for want of adherence, and remain as it were floating in the *abdomen*, the superior branch will discharge into the *abdomen* the matter convey'd to the stomach, and this extravasation will prove mortal; for in this case it is easily perceived, that it is almost impossible that these branches should be secured, so as to join each other by adhering to some of the adjacent parts. It is as evident, that the same misfortune must still happen, though the inferior portion of the intestine remains adherent, if the superior portion, as we have said, discharges its contents into the cavity of the *abdomen*.

But if the inferior branch is drawn inwards, and cannot join the superior, the misfortune is still less, provided this superior branch adheres to the ringlet; for in this case the fæces will be discharg'd from the ringlet, where there will be a perpetual anus.

We ought, however, to endeavour to avoid this last inconvenience, by attempting the adherence of the inferior portion to the margin of the ringlet, instead of tying it, or allowing it to return into the *abdomen*. By this precaution we may, as we have seen in the first and second observation, prevent a disagreeable and shocking incommodity, which lasts all the remainder of the patient's life.

MEMOIR IX. By M. PETIT.

Description of a complicated Tumor, situated on the Trachea Arteria, near the Sternum; with Remarks on the Nature and Cure of this Tumor.

A Lady of forty years of age, very regular in her method of living, and of a pretty robust constitution, was at-
 tack'd with an extinction of voice, al-
 most suddenly, and without any apparent cause from the season, which was then temperate. She had recourse to the drinks commonly used on these occasions, which she took warm, and in large quantities. She did not observe a very severe regimen, during the eight or ten days she was her own physician. Her indisposition continuing, she applied to persons more skilful, who order'd her to be bled in the foot and arms, and then in the throat. She was reduc'd to an exact regimen, and took the remedies seemingly the best indicated, notwithstanding which she was not relieved. The temperate season was succeeded by a heat, so considerable, that the patient not only ceased to drink warm liquors, but also drank the coldest water she could find. Upon the first day of her using this, she spoke so well, that she could not hold her tongue. Such an accident procur'd this specific a reputation, which did not last long; for a few days after, her voice was extinguish'd afresh, and the drinking warm liquors restor'd her to a facility of speech, but indeed the effect of the warm was not so speedy as that of the cold water.

State of the disorder.

In this state I saw the patient for the first time; I examin'd her mouth and throat, in which there was a slight phlogosis: what I further observed,

though she did not complain of it, was an inflation under the thyroid gland, near the *sternum*. This inflation form'd a softish tumor, as large as a small egg; but I did not then dread any terrible consequences from it, because the lady inform'd me that she had perceiv'd it in the same state in which I saw it, after the delivery of a child, about six years before the extinction of her voice. I was satisfied with prescribing for her the general remedies, and then chalybeate mineral waters, which reliev'd her. She quitted these for the use of milk, which was succeeded by a return and augmentation of the disorder. During four months, she would take no remedies but such as were suggested either by her own caprice, or the advices of her friends; but none of them did her any service.

She consulted me afresh, and inform'd me, that for two months she had labour'd under a quartan fever; that for six weeks successively, she had regularly, though without success, taken all kinds of febrifuges, and that the fever had not left her till fifteen days after she ceas'd to take any remedies. Her tumor, whose bulk was not diminish'd, was become much harder, had assum'd a reddish brown colour, and was pretty painful. The skin, which had always been moveable, became adherent in a very inconsiderable point: there was also a very apparent fluctuation. Though the extinction of her voice was less than it had been some time before, yet I judg'd that her disorder might be dangerous, unless it proceeded from a cause which I suspected from the irregular life of her husband, and from some of the disorders with which I had known her afflicted.

After an exact scrutiny, and sincere accounts from both husband and wife, my doubts were clear'd up. Being assured that the cause was venereal, I ordered

The tumor depended on a venereal cause.

ordered mercurial frictions to be made according to the state of the disorder, and the exigencies of the patient, who was not easily govern'd. All I could say to support my sentiment, could not convince the patient. A quack had promis'd to cure her, upon which she committed herself to his care, so that I was five or six months without seeing her; but being reduc'd to a deplorable state, she applied to me for the third time. Her tumor was almost entirely destroy'd, either by the troches the quack had used, or by the putrefaction which had superven'd.

The tumor degenerated into an ulcer.

The ulcer was black, fetid, and as large as a crown; three cartilages of the *trachea arteria* bounded the bottom of it, and her voice had not return'd: a frequent cough, purulent spits, watchings, a slow fever, and a considerable extenuation, render'd this disorder much more important and dangerous than it was before. However, I had the courage to propose the remedy she had before rejected, but to which she now consented, though with a great deal of reluctance.

The preparations were not so long as I could have wish'd, because the cough, which became insupportable, oblig'd me to desist, in order to administer

Specific cure of the disorder.

the specific. The frictions consisted of two drams, one half mercury and the other hogs lard; the two first, used at thirty-six hours distance from each other, appeased the cough a little; the third friction was forty-eight hours from the second, because the mouth had already some smell, and the salivation began to be establish'd. Though the cough was more supportable, it was nevertheless very frequent and redoubled, especially during the dressing of the ulcer, and a little before dressing it. The spits thrown up in coughing were much more fetid than the matter of the salivation; however,

the ulcer began to be deterg'd, and discover'd, almost quite bare, four or five lines of the external surface of one of the cartilages, and the edges of the two adjacent ones. I judg'd that they would exfoliate, at least in some measure; and I was convinced when I saw the fleshy and membranous fibres, which fill up their intervals, fall into putrefaction; but especially when a portion of the membranes which cover them internally was separated, and discharg'd at several times with the spits. The patient evacuated a flake of this membrane, as large and thick as a six-pence, which was separated whilst I dress'd the ulcer, and eliminated with a great deal of difficulty, because the superior interval of the ringlet, which was a little uncover'd, allow'd a portion of the air to enter; and it was only after stopping this hole with my finger, that all the air passing through the glottis, had force enough to expel this flake with the spit which surrounded it. The aperture between the two ringlets augmented in a short time. The separation of the putrefied part produced the same effect in the interval below, so that this ringlet being alone, and entirely uncover'd, became dry; afterwards a portion of it about four or five lines in length exfoliated, and left an aperture capable of containing the point of the finger. The edges of the two adjacent ringlets did not exfoliate, or at least their exfoliation was insensible.

In the first dressings, in order to resist the putrefaction, I washed the ulcer with the tincture of aloes, mixed with a solution of camphire; but afterwards the *trachea arteria* being open'd, I did not apply this lotion, except with an express'd tent, to hinder it from flowing into the *bronchia*, because this remedy, though useful against putrefaction, might have excited a mortal cough. Besides, as I was afraid

Treatment of the ulcer.

left

left in inspiration the air should carry some part of the dressing inwards, I substituted, instead of the doffils and pledgets, a single bundle of soft lint, cover'd with a fine linnen cloth, with which I fill'd the ulcer; I dipt it in storax and basilicon, pretty warm, that it might be impregnated by them. I allow'd it to cool and become fix'd, that nothing might be separated from it, and as it was still soft, it yielded to the ulcer so much the better, because it was a little pressed by a *Nuremberg* plaister, which going round the neck once and an half, retain'd it better than any other bandage would have done. After the removal of the whole putrefaction, the cough diminish'd daily, and at last ceas'd entirely, except in the time of the dressings, when it was pretty violent; but it ceas'd almost as soon as the dressing was applied. I then used my desiccative, and when the flesh appeared granulated, only used pompholyx melted and pretty warm, in which I dipt the bundle of lint, which I always retain'd with the fore-mention'd species of emplastic bandage.

On the fifteenth day of the salivation, the evacuations, which began to be diminish'd, were augmented by a fourth friction, and then by a fifth, each of two drams. At last, on the twenty-second day of the salivation, and twenty-sixth after the first friction, I purg'd the patient for the first time. She had all along had a due solubility of body. I order'd her to be wash'd, and have her linnen changed. She was purg'd every other day, till the thirty-second. Her strength and flesh were restor'd, so that she had no more occasion for my assistance, if her ulcer had been cured.

Though there remained, in the *trachea arteria*, two holes, one above and another below the denudated cartilage, we might have said, strictly

Exfoliation of the cartilage of the *trachea arteria*, discover'd by the ulcer,

speaking, that this ulcer was cur'd, since it discharg'd no matter, and all its circumference was cover'd with a very solid cicatrix, which united the skin and interior membrane of the *trachea arteria*. For fifteen or twenty days I waited with patience, till nature should procure an exfoliation of this cartilage, when a messenger came to tell me that the patient was seized with a violent and obstinate cough. I found her in a deplorable condition, out of which I forthwith took her, as soon as I knew the cause of it. The portion of the cartilage, which had exfoliated by one of its ends, had passed into the cavity of the *trachea arteria*, in such manner, that, both in inspiration and expiration, the air made it move like paper ill-pasted on a window, which the wind causes to tremble. I took it in my forceps, and tried to separate it entirely at its other end, but its adherence was too strong. I tied it with a thread, not only to remove the cough, but also to prevent a more troublesome symptom, which would have infallibly happen'd, if in the total separation the whole piece had fallen into the *arteria trachea*. The thread with which I tied it was pretty long, and retain'd by the circular plaister in such a manner, that it pull'd the cartilage a little outwards, as well to keep it from falling again into the *arteria trachea*, as to accelerate its separation. Three days after the exfoliation was compleat, and the lips of the aperture left by the loss of substance were cicatrized in all their extent. This aperture was exactly round, and so large, that when it was not stoppt, little or no air pass'd through the glottis, either to enter into the breast or come out of it. The inspiration and expiration, made through this hole, were accompanied with a certain disagreeable noise, which made those who heard it incline to cough; but this noise continued only till the aperture was clos'd up by the dressing.

As her strength and flesh were perfectly restor'd, I thought of nothing but to remedy the total defect which subsisted, and of which the patient complain'd greatly. We may easily conceive that it was impossible that nature should regenerate flesh, capable of closing up this aperture; and that all which could be expected from art, was to contrive an instrument of the same nature with the obturator of the palate. This I did with success, by means of a pellote of soft lint, wrapt up in linnen. This pellote, much less than those I used in dressing the ulcer, was dipped in wax and spermaceti, melted with each other, and pretty warm, so that the whole pellote was impregnated with it. Having allow'd it to cool sufficiently, though it was still soft, I applied it to the part, and it filled it so exactly, that, without passing into the internal part of the *trachea*, it exactly clos'd up the passage of the air. As in all the dressings the *Nuremberg* plaister had succeeded to retain the pellote, so I used it to secure this; but having produc'd an erysipelas about the neck, I made a small linnen bandage, composed of two heads, sewed to the pellote, which, after having passed from before backwards, return'd forwards to be tied to the pellote. By means of this contrivance, the patient spoke as if she had never been incommoded; but she could not speak without this instrument, because without it the air did not pass in a sufficient quantity through the glottis. There was a necessity for changing this pellote every eight or ten days, rather for the cleanness of the bandage than that of the pellote, which might have been left longer.

Use of an obturator, to fill up the aperture of the ulcer, and facilitate the voice.

REMARKS on the Nature and Cure of the Disorder.

I have not look'd upon the tumor as the cause of the extinction of the voice, because the patient had labour'd under it six years without its producing any alteration in her voice. It is sufficiently known that, among the great number of women afflicted with such tumors, very few have an extinction of the voice; and if some of them have had this extinction, there are so many other causes capable of extinguishing the voice, that we may suspect them rather than the tumor. We even observe some of these tumors arriv'd at a great bulk, which neither extinguish nor change the voice in the least. Besides, this lady was considerably reliev'd by the hot and cold water, and though her tumor was destroy'd by suppuration or putrefaction, yet her extinction of voice still continued.

The tumor was not the cause of the extinction of the voice.

The reasons I had for salivating her were, her heat of urine, and the shankers, which her husband had given her, and for which she had been under the care of the pretended givers of specifics, with whom *Paris* is infested, and of whom we should have no reason to complain, if we only regarded our own interest. The treatment of this kind soon after gave proofs of its perfidiousness, by pustules, which appear'd all over the body, and which the patient treated as an ebullition of the blood. These pustules were, however, so well characteris'd, that a surgeon could not mistake them. These were, no doubt, reasons sufficient for salivating the patient; but supposing they had been unknown to me, I should have then only had suspicions; tho' these suspicions had been founded on the extinction of the

Signs by which the author discover'd the cause of this disorder.

the voice, the quartan fever, and the character of the tumor.

The extinction of the voice, as it is well known, too often accompanies the *lues venerea*, not to excite an attention to the relations the one disorder may have with the other; especially when this extinction has no determin'd cause, continues long, resists the best indicated remedies, and disappears and returns almost indifferently, after the use of hot or cold water.

Let us examine whether we find, in the quartan fever, any thing which either fortifies or weakens our suspicions. Those who have observed a great many venereal disorders know that a quartan fever is sometimes a symptom of a pox, or, at least, that pocky patients are more subject to this than to any other species of intermittent fever. I have cured many persons, who had no other symptom of a pox than a quartan fever; and, among others, a man of sixty years of age, who from the age of forty had almost always an intermittent fever. He was salivated, by which means he was perfectly cured of his fever, and has felt nothing of it since. What determin'd me to treat him in this manner was, because, some time before the commencement of his fever, he had shankers and budoes; and because the febrifuges he had taken, according to the methods of all the different parts of *Europe* into which he had travell'd, had not been able to free him from his fever.

I do not say that it is necessary to salivate all those attacked with a quartan fever, or an extinction of voice; but since both these may be symptoms of a pox, we certainly have a right to examine the patient in this respect, and often the answers are more than sufficient to determine us. Success has confirm'd me in this thought, and I should think myself wanting in my duty, if, in similar

imilar cases, I did not propose all the questions necessary to discover whether the quartan fever and the extinction of voice were produc'd by a venereal virus, or were independent of it. What I say of these two symptoms, may be said of a great many others, such as the cough, deafness, polypus of the nose, epilepsies, ophthalmies, gutta serena, diarrhoeas, hemorrhœdal fluxes, fistulas, and a great many others, which have been often, and, I dare say, too slightly, look'd upon as independent of the venereal virus. In a word, we may look upon them as produc'd by this cause, when the salivation cures them easily and without return, after they have, for whole years, resisted the use of remedies apparently well indicated.

The third thing on which I should have founded my suspicion of a pox, was the character of the tumor. I do not mean that which she had six years, but that which she shew'd me during the last months of her disorder. This tumor, which was before soft, became hard, painful, and adherent to the skin. It chang'd colour, and in a small point a fluctuation was perceiv'd in it. It had the appearance of venereal buboes, the whole of which is hard, whilst a small portion seems inclin'd to suppurate. It is true, if I had not been prejudic'd by the two first symptoms, the extinction of the voice, and the quartan fever, I might have look'd upon this tumor, which had no signs of a scrophula, as carcinomatous; but the application of caustics, without producing either good or bad effects, made me think differently of its nature. In a word, this tumor had been intolerably corroded for three months, without acquiring the character generally assum'd by carcinomatous tumors, when they are irritated by similar topics. From these observations it is evident, that, though I had not been certain that this lady was pox'd, yet I should have

have had sufficient reasons to suspect it. It is, therefore, a foolish delicacy, not to put questions to those labouring under disorders which may be symptoms of the pox, especially when these disorders have resisted remedies apparently well indicated.

It seems surprising that this disorder was not accompanied with an emphysema; there is, however, one reason for it, which seems natural, and which is, the largeness of the aperture in the *trachea*, which allow'd the air to pass and repass with liberty, and without giving it an occasion of introducing itself into the cellular texture of the fat or other adjacent parts. This reason, though highly natural, is not the only one I admitted. In order to the production of an emphysema, it is not sufficient that the air find a difficulty, either in passing or repassing, in the *trachea*, but it is also necessary that it should find the cellular membranes dispos'd to receive it. Various causes are capable of blocking up these cellules, even in wounds of the *trachea arteria*; but I shall only here speak of the cause, which must necessarily have closed them up, in the case which makes the subject of this observation.

Why the aperture of the *trachea* was not accompanied with an emphysema.

The air could not come out of the *trachea arteria*, except when there was an aperture in it. There could be no aperture but by the separation of the gangren'd portions: the gangren'd portions were only separated by the growth of the flesh, and flesh could not grow without blocking up the mouths of these cellules. Thus there could have been no emphysema, though the aperture of the *trachea* had been smaller. What even amounts to a proof that it was not the largeness of the aperture that prevented the emphysema, is, that this aperture was not large in the first days. It is true.

if the cellules had not been consolidated, the greatness of the aperture might perhaps have hinder'd the emphysema. But the aperture being small in the first instants of the separation of the eschars, no other cause could oppose the emphysema, but the consolidation of the cellules.

The last reflection, I shall make on this observation, relates to the exfoliation of the cartilage; it was therefore happy that this was made at two times, since, if it had been made at once, it might have fallen into the *trachea arteria*, and proved mortal. I should have prevented this danger, by tying this cartilage as soon as I knew that it would exfoliate: This fault I willingly acknowledge; since it may be of some advantage to others, if it was only to excite their care and attention.

The care which in similar cases the exfoliation of the cartilage requires.

MEMOIR X. By M. PUZOS.

On the Floodings incident to pregnant Women, the Means of stopping them without proceeding to the Delivery, and the Method of proceeding at the Delivery, in Cases of necessity, in a Way more gentle and certain than that generally used upon similar Occasions.

THOUGH floodings in pregnant women may happen at all times of gestation, yet the beginning and end of this state are most subject to this accident.

Causes of bleedings in pregnant women.

The floodings incident in the beginning of gestation arise from different causes, such as abortions, the retention of the placenta in the uterus, after the discharge of the foetus, impregnations agitated by any accident, and false conceptions dispos'd to expulsion.

Those floodings which happen towards the end of gestation, are almost always produc'd by the partial or total separation of the placenta from the bottom of the uterus.

The separation of the placenta.

Abortion, or the discharge of the foetus before its maturity, is always accompanied with a flooding, which is moderate when the uterus only expels the foetus, but very copious when the uterus labours to expel the placenta.

Abortion.

The public often accuses those employ'd in such abortions, of ignorance, for leaving the expulsion of the placenta to nature, instead of seeking the means of extracting it. But this is unreasonable, since it is not in the power of art, in deliveries at

two or three months, to obtain the discharge of the placenta, which may be retain'd in the uterus by different causes.

The placenta often remains in the uterus, when the navel-string, being too weak, is not sufficient for its extraction, and when the pains are not sufficiently brisk to obtain that end. The placenta is also retain'd, when the aperture, which gives vent to the foetus, is not sufficient to admit the placenta. It is also impossible to extract it, when it adheres too strongly to the bottom of the uterus, since in this case it is better to wait till nature delivers herself, than to employ useless efforts to extract it.

The placenta remaining in the uterus, after the expulsion of the foetus, produces a disorder greater or smaller. If the placenta is entirely disengag'd, and the uterus has strength enough to engage it in the orifice of the vagina, the flooding, which may have been violent till that time, is moderated by the dislodgment of a body, which, without nourishment, decays in the place where it is left, and permits the part to contract in proportion to its diminution. This contraction moderates the hemorrhage, by the immediate application of the sides of the uterus to the extraneous body, and by the shrivelling up of the vessels, which necessarily succeeds the contraction of that organ.

If the placenta is adherent, and the circulation between it and the uterus furnishes it with nourishment, the flooding is so inconsiderable as only to be a kind of oozing; but as soon as nature attempts its separation and expulsion, as many parts of the placenta as are detach'd, so many sources are open'd for the effusion of the blood. This effusion is still greater, when it is totally separated, because the prodigious number of vessels which it obstructed
by

by its adherence, permits the blood to flow profusely, till the uterus is freed from that fleshy mass; or till, contracting itself, it makes it decay, and lays a foundation for its being extracted by art.

In similar cases, I have seen women afflicted with such copious floodings, that they would have been in danger of dying, without the assistance I afforded them.

Such was the case of a lady, happily deliver'd of a foetus, at the end of three months:

She could not have been deliver'd by the means already mentioned. No symptom supervened from the deli-

I. Observation by the author, on a flooding occasioned by abortion.

very till the eighth day, on which the flooding became so violent, that the nurse and people of the family began to think her life in danger. Upon being sent for, I found all her extremities in a cold sweat. Her paleness and weakness denoted the quantity of blood she had lost, and the danger she was in. Upon examining her, I found that her pains, which had only ceased by the exhaustion of the blood, had carried a portion of the placenta into the orifice of the vagina: I laid hold of this portion, agitated it gently, and brought on the pains. These new pains encouraged the patient; I ordered her to use the little strength she had, and prevailed upon her so to do, by making her hope that she would be soon deliver'd. Accordingly I brought away the whole placenta, upon which the flooding ceased almost immediately, and the patient was restored to perfect health in a very short time.

False conceptions, or false impregnations, necessarily produce floodings by the sudden rupture of the pedicle, by which they adhere to the bottom of the uterus, and by the efforts which that organ makes to expel extraneous bodies.

False conceptions.

These floodings, which are sometimes moderate,
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and sometimes very violent, do not, generally, yield either to venesections, or any astringents, since it is only the expulsion of the false conception from the uterus, or at least the removing it from the bottom of this part into its neck, which can diminish them*. As this species of delivery is more the business of nature than of art, we ought to make the patient take light nourishment to support her strength, and to give time to the pains and concretions to put the false conception in a condition to be laid hold of, when nature wants strength to bring about a delivery, or even to leave it to a kind of suppuration by putrefaction, when it cannot be laid hold of by the forceps, and when the cessation of the pains and flooding makes us suspect that the false conception can have no other termination.

Among all the women I have relieved on similar occasions, I have seen none more exhausted than two ladies of note, in the same year: Each of these evacuated more than six or seven pounds of blood, in less than twelve hours, at the end of which time the false conceptions fell into the neck of the uterus, and were easily extracted.

II. Observation, by the author, on excessive floodings by a false conception.

I should have had reason to be afraid, on a great many occasions of this nature, if experience had not taught me that it is extremely rare to see women die of floodings, caused by false conceptions, or abortions of foetuses, before the fourth or fifth months, unless such deliveries are complicated with a more dangerous disorder, or unless the patient has wanted proper assistance.

This

* It is often sufficient to stop the blood, that the false conception falls into the neck of the uterus; because this part, on such occasions, lengthens so as to contain two thirds of the false conception, and to give liberty to the body of the matrix to brace itself up. I have sometimes seen the neck of the uterus as long as a person's finger, and, in some respects, represent a sheath or scabbard.

This does not hold true of floodings which happen in the seventh, eighth, or ninth months; since these, tho' generally less considerable, before the delivery, than those last mention'd, have sufficiently taught surgeons the dangerous consequences they produce, and the imminent danger of the patient; and, tho' they do not seem very terrible to by-standers, yet too often justify the fatal prognostic which had been made, by proving mortal soon after the delivery.

Flooding happening near the end of gestation.

Floodings near the end of gestation may arise from different causes, but most generally proceed from the separation of some portion of the placenta from the bottom of the uterus. This cause being suspected, would almost always lay a necessary foundation for a delivery, if experience had not convinced us that we may, with proper precautions and remedies, stop, for some time, a flooding produced by such a separation; and that we ought not to proceed to the delivery till milder methods have been used to no purpose, or when the flooding is accompanied with pains, weakness, and some dilatation in the orifice of the uterus.

Causes of those floodings which happen towards the end of gestation.

The methods we ought to use before proceeding to the delivery, which can only be forced, are frequent venesections, medicines capable of calming the effervescence of the blood, light aliments in small quantities, keeping constantly in bed, and clysters of warm water, to prevent the efforts the patient may make in going to stool. These wise precautions have often suspended, and sometimes totally stop'd, floodings of blood, accompanied with small concretions, not by sodering, or again fixing the separated portions of the placenta, but in giving time to the blood stopping at the mouths of the vessels, to co-

Means of curing floodings in advanced gestations.

agulate, and form a kind of obturators capable of stopping the blood*.

A flooding, stop'd by so inconsiderable a means, and so susceptible of a disorder by the least imprudence, requires the greatest care and circumspection in women. I have seen some sufficiently wise to neglect nothing that was prescribed them, in consequence of which their deliveries have been very happy.

In 1741 I deliver'd a lady, who had a very considerable flooding about the middle of gestation. This symptom was accompanied with pains, and a discharge of concretions, which are almost always certain signs that the delivery is at hand. Not content with having blooded the patient several times, I once passed a considerable time with her, expecting a labour, which I thought at no great distance. However, the pains being mitigated, and the flooding diminished, I left her, desiring that she would constantly keep her bed, without so much as rising to ease nature. My orders were punctually obey'd; the symptoms diminished by little and little, and the flooding stop'd entirely at the end of fifteen days. The patient kept her bed a month after the symptoms disappear'd, and her chamber all the rest of her gestation. At last, in the ninth month she was delivered of a healthy sound child, who at present recompenses her for her toil and fatigue in order to preserve its life.

This accident does not always succeed so happily, either by the imprudence of women, who too soon neglect the precautions prescribed, or the insufficiency of the means employed to stop the blood, or keep it stop'd by the small concretions in the mouths of

* The proofs that the parts of the placenta, separated from the uterus, do not again adhere to it, when the flooding is stop'd, are the frequent returns of the flooding during the rest of the gestation, and the concretions of blood found in the part of the separated placenta after the delivery.

of the vessels. It is very ordinary to see the flooding appear again, after a suspension of several days, or even weeks, and to perceive that the blood flows more copiously, than when the disorder first appeared †.

When a flooding appears again, and does not yield to the means employ'd formerly with success; when the concretions discharged from the uterus excite some pains, and dilate its orifice a little; when the flooding is accompanied with weakness, and when there is no longer any doubt of the separation of some parts of the placenta, we ought to proceed to the delivery, which is then necessary, and must be performed, however little disposition there should be towards it; because, if we should commit this operation to nature, which always acts slowly in floodings, we should lose a precious interval of time; the mother and child might die before the delivery was at an end, and we might justly blame ourselves for not having used a method, which is recommended by the best authors, and which is daily authoris'd by the present practice. We are so much the more oblig'd to this method, because it is easily executed in this disorder, and because, if we are not happy enough to preserve the mother by this forced operation, yet we often save the life of the child, and sometimes both escape so great a danger.

Case in which it is necessary to proceed to delivery in floodings.

This method, as commonly practis'd, being attended with great inconveniences, and not securing us from the misfortune of seeing almost as many mothers and

The author's manner of delivering in floodings.

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infants

† It is to be presumed that the repetition of the floodings, towards the end of gestation, augments the separation of the placenta, because the first concretions, expelled from the mouths of the vessels, receive new layers of blood, which begins to flow; and because becoming larger, they farther separate the internal sides of the uterus from the placenta, just like small wedges, which, the more they are augmented in quantity or bulk, between two bodies, the farther they separate the one from the other.

infants cut off as preserved by it, I thought it incumbent on me to discover, among the different manners of practising these necessary deliveries, a method which might render them less dangerous, and spare surgeons the grief of seeing women die in half an hour, or an hour, after delivery, apparently very happy till that moment.

The success has answer'd the pains of my researches, since I flatter myself with having found a method, which, retaining a due medium between the natural and forced deliveries, better than any other, fulfils the indication of a necessary and speedy delivery.

Before pointing out the advantage of this method, above that hitherto practised, I think it expedient to say something on the absolute necessity of delivery in a flooding, when it is caused by the rupture of any of the adherences of the placenta; and on the small success of the forced delivery, tho' easily and speedily terminated.

In order to demonstrate the necessity of delivery in a flooding, which appears in a far-advanced gestation, when this symptom has not yielded to the means already mentioned, we must represent to ourselves a prodigious quantity of sources, open'd in the bottom of the uterus, by the separation of some parts of the placenta. These sources, which can never be dried up, but by the bracing up and contraction of the parts, continually discharge blood, so long as the infant is included in its cavity, and whilst nature labours weakly to expel it; so that we are obliged to have recourse to the forced delivery, hoping to facilitate the contraction of the uterus, by freeing it from bodies which kept it passively dilated, and to obtain the contraction of the open vessels by the same means, with a view to preserve both

*Surest method of
delivery in flood-
ings.*

both mother and infant, by an operation which fails almost as often as it succeeds.

If the safety of women seized with floodings always corresponded to the intentions of those who flatter themselves with having preserved them, by a supposed necessary operation; or, if the proofs of this necessity were sufficient to render us indifferent with respect to the lucky or fatal event of this kind of delivery, we might still adhere to the practice transmitted to us, or rest contented, like our ancestors, with the sorry advantage of preserving some women from a danger, which is still fatal to a great many others, notwithstanding all our care and precaution. But, as indifferent success is not capable of making persons, intent on the progress of their art, forget the misfortunes inseparable from a particular operation; and as I can affirm that I never thought myself recompensed for the death of one woman, by preserving the life of another, so I have cheerfully embraced a method of preventing the forced delivery; and I have adhered to this method so much the more faithfully, because it has succeeded with me as often as I have had an opportunity of putting it in execution.

Having been often called to the assistance of women seiz'd with a flooding immediately before delivery, I have observed that those who had pains sufficiently strong to allow nature to act in a labour which promised celerity, lost less blood than those whose pains were languid; that the augmentation of these pains was a means of stopping, or suspending, the flooding, before the end of the labour; that such women were very happily delivered; and that very rarely the fatal consequences of the forced delivery disturbed the success of these natural operations.

These happy events in the circumstances where

It is usual to have only languid pains in floodings.

art is sometimes employ'd with too much precipitation, made me imagine that, instead of having recourse to the forced delivery, even in cases which seem to require it most, inverting the order of nature by returning the infant, and running the risques accompanying such a violence, it would be far better to procure pains, at a time when there are generally none, or to augment them, when they are too languid to terminate the delivery in a natural manner.

This reflexion was justified by the happy proofs, the history of which I shall afterwards give; and, from that time, I was persuaded that, tho' delivery was absolutely necessary in floodings, yet this operation ought not always to be precipitate; and that it was generally more advantageous not to employ art, but with a view to approach to the order of nature, if that was possible, since this was the method which succeeded best.

Being thus determined in my choice, nothing was wanting to my discovery, but to find why the forced delivery, tho' speedy and easily perform'd, was more dangerous than the natural delivery, when promoted by proper assistance, tho' more long and painful? A knowledge of the functions of the uterus, after delivery, has greatly contributed to make me discover the cause of this. It is sufficiently known that, in both these deliveries, as soon as the infant and placenta are removed, the uterus forthwith discharges a large quantity of blood; that it would even permit the whole blood of the body to be discharged, if, by its natural disposition to contraction, it was not considerably braced up, and if it did not proportionably diminish the apertures of the vessels which discharge the blood; and that if, by any cause whatever, the contraction of the uterus is not made to a degree sufficient to compress the vessels, the blood continues to flow copiously; and the mother,

ther, becoming gradually weaker and weaker, dies soon after her delivery.

This mechanism, being agreeable to the discoveries of anatomy, and authoris'd by experience, let us compare these two species of deliveries, in order to judge in which of them the contraction of the uterus must be made the most surely, by supposing two patients equally weakened by a flooding.

The natural delivery is when the uterus gradually, and by different degrees of force, expels the infant from its cavity, and for this purpose only uses the natural pains, and the efforts depending upon them.

Parallel between
the natural and
forced delivery.

The forced delivery, more subjected to the will, than the stated laws of nature, is performed without waiting for pains, and without having obtained any considerable dilatation of the orifice of the uterus. In this method the hand compleats the begun separation of the placenta, and, as precipitately as possible, extracts the infant and placenta.

In the natural delivery, if the pains continue and augment, and if the infant approaches to the orifice of the uterus, or is engag'd in it, we are certain that the uterus is braced up in its bottom, in proportion to the progress of the infant. This is sufficiently evident, because the contraction of the body of the uterus is the immediate cause of the pains, of the expulsion of the foetus, and of the dilatation of the orifice.

In the forced delivery we are almost always certain to extract the infant from the uterus in a very short time; but we cannot be certain of its contraction after the delivery, to such a degree as to be able to stop the blood.

In the natural delivery, we have often the satisfaction to see the flooding cease, when the pains are most violent; for, at that time, the uterus strongly applied to the foetus, in order to make it advance,

is itself compressed by the solidity of the body it contains, and which it protrudes forwards. This mutual compression of the uterus on the infant, and of the infant on the uterus, must closely stop up the apertures of the vessels, which are, by this means, as it were, compressed between two bodies, which not only touch each other immediately, but are also continually applied to each other, till the end of the delivery.

In the forced delivery, we sooner put the uterus in a power of contracting itself, by freeing it from the bodies which kept it passively dilated. But we can neither communicate strength to it, nor direct its contraction by slow degrees, sufficiently proportion'd to its weakness. On the contrary, this part, being destitute of succour and assistance, as well externally as in its cavity, by its proper force reduces itself from a vast extent, to the point of contraction it ought to have, in order to stop up the diameters of the vessels, and diminish the effusion of the blood: That is to say, the matrix must, after this operation, make in an instant about ten or more advances towards a contraction, than it does in an hour or two, in a labour brought about by nature. Now, as a great deal of strength is requisite to perform so considerable an action, and as the blood lost before and during the violence of the operation, rather weakens than invigorates the uterus, it is not surprising to find the blood flow from vessels remaining open in the bottom of a part without action, and perhaps as much dilated as before the delivery, and to see the mother die a short time after an operation perform'd to preserve her.

This parallel, establish'd on the strictest truth, sensibly shews that we must necessarily preserve almost all women, by the natural delivery, when there is a possibility of practising it; and that much fewer must

must escape after the forced delivery, which is susceptible of so many dangers.

Whatever advantage the natural birth seems to have over the forced delivery, I would not advise to prefer it, if we could not find the means of freeing it from an inconvenience, which had made it forsaken and abandon'd. This inconvenience is, the slowness by which this natural operation generally terminates: This slowness, by giving time to the discharge of the whole blood, may prove mortal both to mother and child, before the end of the delivery. This engaged the antients to practise the forced delivery in these cases, and to employ a doubtful method, rather than none at all.

The method of remedying the slowness of the natural, is to borrow something from the forced delivery, the possibility of which I have often found from experience. This end, then, is ob-

Method of remedying the slowness of the natural delivery.

tained by dilating the orifice of the uterus with the finger, in the same order, and with the same mildness, as nature generally uses in ordinary cases. It rarely happens that a flooding, caused by the separation of some portions of the placenta, does not produce a greater or smaller aperture of the uterus. The quantity of blood which acts on the orifice, and the concretions form'd there, are, as it were, so many wedges, which dilate it, and dispose it to yield to the weight of the included bodies. This beginning of dilatation determines the delivery, and is sometimes accompanied with slight pains. But as the weakness, and even faintings, which are usual symptoms in floodings, are often obstacles to the continuation of the pains, and the action of the uterus to expel the foetus, we are obliged to restore these pains, and this action, when they are wanting; or to augment them, when they are too weak. For this

this purpose, we must introduce one or more of our

Foreign means added to those of nature, in order to accelerate the natural delivery in floodings.

fingers into the orifice, with which we must labour to dilate it, by degrees of force proportion'd to its resistance. This gradual dilatation, now and then interrupted, produces pains,

puts the uterus in action, and both these inflate the membranes, which contain the waters of the foetus.

Our principal care, on such an occasion, ought to be to open the membranes as soon as possible, in order to procure the discharge of the waters, which diminishes the distension of the uterus, and furnishes it with the means of contracting itself, and possessing the space before occupied by those waters on its cavity. The uterus being thus contracted, and dis-

The uterus always tends to contract itself, and possess the space of bodies expelled from its cavity.

posed to be still more so, pushes the foetus from the bottom towards the orifice, and excites stronger pains, so that voluntary and involuntary efforts concur. The pains and efforts pro-

perly employ'd by the mother, and seconded by the action of the fingers, twisted circularly in the orifice, in order to dilate it, generally succeed, and make the foetus advance. The blood which was formerly discharged is retained in the vessels, by the general compression and contraction of the parts. At last, nature and art concurring to promote the delivery, this effect is generally obtained in a short time; and we have almost always the satisfaction of preserving the lives both of the mother and child, which they would have infallibly lost, by the simply natural delivery, and which would have been greatly endanger'd by the forced delivery.

It is therefore possible, on a great many occasions, to reduce, to a natural operation, a delivery, which, on account of the abovemention'd symptoms, must have been terminated by a forced operation. But as this method might, perhaps, appear to be
rather

rather founded on theory than on experience, if it was not supported by observations, I shall give one sufficient to convince those who, at present, may possibly be of a different way of thinking.

A lady, nine months gone with child, some years ago had a considerable flooding; and, being afraid of the consequence, forthwith sent for me. The frequent oscillations and weakness which accompanied her flooding, made me think her life in danger. I therefore determined to deliver her, tho' she had no pains, on account of some preparation I found already made, and for fear a delay should put her in greater danger. The patient took the precautions, with respect to her soul, which ought always to precede operations so susceptible of dangerous symptoms. When this important work was at an end, she was seized with gentle pains, which I encouraged and augmented, by the means I usually employ'd; and by their help I penetrated the membranes which contain the waters. The discharge of these, which was forthwith made, greatly augmented the pains; the labour advanced, and I had the happiness to deliver the lady of a live child; neither was the delivery succeeded by any symptom.

IV. Observation by the author, on which he regulated his practice in the treatment of other similar cases.

I have behaved in the same manner to other poor women, in whom I found strength enough to allow nature to operate by assisting her a little, and always with the same success.

A lady, wearied by several premature deliveries, was at last near the end of a gestation, which, till the time I was called, had been very happy. She was wallowing in blood when I visited her at eleven o'clock at night, and was so much the more frightened at her condition, because she felt no pains, and perceived that the flooding was augmented every moment.

V. Observation by the author on the same subject.

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I was not, in reality, more certain than she what measures were most proper, having always been afraid of the event of these kinds of labours. However, after having examined the state of things, in order to determine me to the most expedient method, I found that, by pressing on the dilatation at the orifice, occasion'd by the flooding, I produced pains. I continued to make such motions as augmented them, and at last procured a discharge of the waters. This evacuation was happy both for the mother and child, in the space of three quarters of an hour.

In 1737 I was importunately begg'd to visit a woman, who had a violent flooding near the end of her gestation. Upon my arrival at the place, I found the patient in almost continual faintings, from which she seemed only to recover, in order to tell, in interrupted words, the great danger she was in. Upon examining her situation, I found the uterus dilated to the extent of a shilling. The patient had very small pains: The blood which she had lost, and that which she was still losing, in conjunction with the hardness of the circle of the orifice, made me afraid of using my method, and of being obliged to use the forced delivery, the event of which I dreaded. However, animated by the condescension and courage of the patient, I endeavoured to dilate the orifice, and made it yield gradually. The pains became stronger, and the membranes, before lying about the head, were inflated. It was not, however, till after an hour's labour, both on the orifice and membranes, that I could penetrate these last, and procure a discharge of the waters. As soon as the uterus was freed from these, it began to operate with stronger contractions, which made

VI. Observation,
by the author, on
the same subject.

It is sometimes very difficult to penetrate the membranes with the finger, especially when they lie close upon the head of the fœtus, and are not raised by the waters.

made the foetus advance, diminished the flooding, and produced such efficacious pains, that the woman was soon after delivered. I supported her strength by spoonfuls of broth, given frequently and alternately with *Alicant* wine. The infant was brought forth alive, and the mother enjoys good health since her delivery.

Upon comparing the good success of dangerous deliveries, which I have committed to nature, with the fatal effects which but too often succeed forced deliveries, I do not hesitate to give the preference to the natural method, when the situation of the infant permits it to be followed; since this operation is more safe, and conform to the laws of midwifery. This method still furnishes us with another advantage, which is, that, if the bad situation of the infant, or other dangerous symptoms, should render it necessary to shorten the time requisite for the natural delivery, what we have done in order to obtain it, serves as a preparation, disposes the orifice to yield to a more violent and speedy dilatation, and renders the forced delivery much less painful. This happened some years ago to a poor woman, about eight months gone, who had a terrible flooding, and so frequent faintings, that she was in danger of dying, before any relief could be afforded her, I and M. *Gervais* being sent for, thought the case so dangerous, that we did not choose to take any step till they had satisfied a particular desire of the patient, which was, that she might receive the sacrament. I went to a place in the neighbourhood, leaving M. *Gervais*, who is well skill'd in deliveries of this kind, with the patient. Upon returning, soon after, I found the operation perform'd,

Reasons for preferring the natural to the forced delivery.

The methods employ'd in obtaining the natural delivery, cannot prove injurious to the forced delivery, if we should be obliged to have recourse to it.

VII. Observation by M. *Gervais*, on the same subject.

form'd, and the woman in a pretty good state. M. *Gervais* inform'd me, that, having done all he could to excite the pains, and gently dilate the orifice of the uterus, there was such a copious effusion of blood, that he durst not confide in the efforts of nature; that he took the advantage of the beginning of the dilatation to penetrate into the uterus, and extract the foetus by the forced delivery. His operation, however, succeeded; tho' he had formerly try'd the natural method, in the manner he had seen me practise it.

In 1739 a lady, eight months gone, who had been happily delivered of several children, being abroad at supper, and having eat pretty reasonably, suddenly felt herself so wet, as to become anxious and uneasy. Upon going into another apartment, in order to discover the nature of the dischatge, she was in a prodigious consternation when she saw that she evacuated blood, and that the flooding augmented every moment. She forthwith resolved to go home; and the most proper method of conveying her thither, was thought to be in her own coach, where she was placed in such a manner as to be half sitting and half lying. As she could not be defended against the joltings of the coach, tho' its motion was extremely slow, there was so much blood discharged before she got home, that not only her petticoats, but also the cushion of the coach were wet with it. When she was conducted to her apartment, in order to be put in bed, there were concretions fell from her in taking off her cloaths, which reduced her to extreme weakness, of which I was a witness almost as soon as the by-standers, in consequence of the expedition with which they called me. As the flooding was accompanied with some pains, I found the orifice of the uterus dilated, to the extent of a shilling. Tho' I might have taken advantage

VIII. Observation
by the author, on
the same subject.

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tage of this aperture to perform the forced delivery, yet inclining rather to try the natural method, I gradually dilated the orifice, made the pains augment, and by this means determin'd the waters to distend the membranes, and to present them to the orifice in form of a tumor. I opened the membranes as soon as possible, the discharge of the waters rendered the pains stronger, the uterus contracted, or brac'd up in its cavity, which made the infant advance to the orifice, and from that time forth the flooding diminished. The continuation of the labour made it cease altogether, and the delivery was obtained about an hour after the discharge of the waters; the infant was dead, but the mother became gradually better, and is at present in a state of good health.

In the same year a lady, about four leagues from *Paris*, six months gone, was suddenly seized with a flooding in her bed. I being call'd, and finding no appearance of a delivery, order'd her to be forthwith bled, and prescribed a second venesection next day, or the same evening, if the flooding required it. I enjoin'd the patient carefully to keep her bed, to use as little motion as possible, and to observe a regimen proper to her situation. The flooding stopt next day, but appeared fifteen days after, for which reason she was bled as before, and the venesections had the same success. Two months passed without any symptoms, which made the patient resolve to come to *Paris*, that she might be deliver'd with more tranquillity than she could have been in the country. I permitted the journey, provided she was carried in a proper litter. She arrived in town without any accident, and took bed, with a design to keep it till her delivery. But, some days after, the flooding appear'd afresh, accompanied with some small pains, for which I was called. After

IX. Observation,
by the author, on
the same subject.

examining whether these symptoms were not the beginnings of a real labour, I found the uterus sufficiently dilated to make me believe that the delivery was determined. I order'd three porringers of blood to be taken from her, after which the pains being too weak to allow them to act by themselves, I labour'd, in my method, to assist nature. The orifice of the uterus being extremely hard, long resisted the gradual efforts I made to dilate it. A weakness now and then superven'd, but the return of the pains carried it off. At last I pierced the membranes, the waters were discharged, and the pains augmented by their evacuation. In proportion as the labour advanced, the flooding diminished, and the patient resumed strength and courage. This assistance, joined to the means I used, obtain'd a delivery in three quarters of an hour. The child was born alive, and the mother, after some time, recover'd her usual health.

It is proper to advertise young surgeons that floodings, which happen between the sixth and seventh month of gestation and the delivery, are subject to return, tho' stop'd by venesections, or any other means. The reason of this is because these floodings, being more commonly caused by the separation of some portion of the placenta, than by the rupture of vessels in any other part of the uterus, are only stopp'd by concretions formed at the mouths of those vessels, and not by a re-union of the parts accidentally divided. As these concretions cannot long oppose the motions of the body, the involuntary efforts of the part, and the impetuosity of the blood, we may, from the first attack of the flooding, dread the possibility of a return, the danger of such an accident, and the necessity of proceeding to the delivery, either by violence, or the labour of nature assisted by art.

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MEMOIR XI. *By M. PETIT.*

Remarks on various faulty conformations of the Anus in new-born Children.

AMONG all the faulty conformations of new-born children, the most common, excepting spots of the skin, are excrescences, the hare-lip, and imperforations of the pudenda, the urethra, and anus. I have made various observations on these different subjects, but a recent occasion having brought those on the anus, of which I have a considerable number, to my remembrance, I thought proper first to describe these, hoping afterwards to relate those I have made on the other faults of conformation. As I shall only relate what I have seen myself, the reader will not be astonished if there are some faults of this kind, which are not comprehended in the enumeration I shall make.

Want of aperture in the anus.

Some children are born without any aperture of the anus, and without the least mark of such an aperture; others have the part of the anus perfectly mark'd out, without any aperture; and others have an aperture into which we can introduce a probe more or less deep, such as two or three lines, and even more. In these last the anus appears very well formed, so that the fault of conformation is more or less deep internally. I have seen some in whom the anus open'd into the bladder, others in whom it open'd into the pudenda, and others in whom, without opening any where, it form'd a tumor in the manner of an hernia.

Want of aperture of the anus in three different cases.

I shall begin these observations, with those on an imperforated anus, without any external trace or mark.

First case.

I. Observation, by the author, on an infant without any aperture, or mark of an anus.

An infant was presented to me by a poor woman, which, though it had been three days brought into the world, had not as yet evacuated its *meconium*. The abdomen was very hard, and considerably inflated; the urine, which was discharged the first two days, was now retain'd; the respiration was very laborious and interrupted; the efforts, in vain made to go to stool, were accompanied with convulsions, and the blood, retain'd in all the veins by the violent contractions of the muscles, render'd the whole skin of a brownish, livid, and violet colour, which disappear'd as soon as the convulsive efforts ceased. The pulse on this occasion was small, contracted, and sometimes entirely lost, whilst at the same time the extremities were cold. Upon examining this poor infant, I found no mark in the place where the anus ought to have been. After due consideration, I thought I might advantageously introduce a lancet, in the place between the extremity of the coccyx, and the beginning of the perinæum. The edges of the lancet being turned to both these places, I plung'd it somewhat obliquely from before backwards. I found considerable resistance, at least I did not perceive that yielding to the point of the lancet or bistory, which in opening an abscess we feel, when we arrive at the seat of the pus; and as I still perceiv'd that my lancet penetrated a solid substance, I inclined the point of it more, and directed it towards the coccyx, in order to approach to the rectum. Upon this I felt less resistance, because my lancet enter'd the place where the fæces were, which were copiously discharg'd, being preceded by a great deal of wind. The infant was reliev'd, but died of convulsions next day, tho' he had evacuated both the urine and *meconium*.

As I was not entirely satisfied with my operation,

tion, I open'd the carcass, and found that what had made so great resistance to the introduction of the lancet, was that part of the intestine which the sphincter covers. It was so clos'd up, as to form, with the contracted sphincter, a round and solid body, seven or eight lines in length. As I had cut it somewhat irregularly, notwithstanding the care I took to follow the natural direction, I attributed this irregular cutting to this, that the large part of the intestine, which was considerably dilated in the time of operation, had pushed this part of the anus to one side, so as to change its direction. I did not however find in the parts adjacent any disorder to which I could ascribe the death of the infant, so that I am certain it did not die by the operation. However, among all the cases I have related, this is the most dangerous, both for the patient and the operator, as I have observed on different occasions, when I have not been more successful, as the reader will perceive in the following observations.

Another child, in the same case with the preceding, was under the management of two surgeons, one of whom, having made a crucial incision in the skin and fat, endeavoured, by his finger, either to find the natural passage, or to make a new one; but he not only fail'd of success, but also dilacerated the neighbourhood of the rectum, and detach'd it from a part of the os sacrum, by passing his finger forcibly between them. The second surgeon, who did not see the infant till three hours after this operation, was greatly surpriz'd when he did not discover the disorder mentioned to him, but, instead of a wound, found a black tumor as large as a prune, which passed thro' the incision, and concealed it entirely from him. The operator, finding this tumor soft, made a puncture

II. Observation by the author on the same subject.

in it with his lancet, upon which the *meconium* was discharged, and the patient relieved; but he languish'd for seven or eight hours, and died.

Upon opening the carcass, I found all the parts of the abdomen, especially those of the pelvis, in a gangrenous disposition. The rectum was open'd, in its posterior part, about a finger-breadth above the place where the intestine was close. I cut off the last vertebra of the os sacrum, that I might be encumber'd with no bone except the coccyx, to which the anus is naturally attach'd. As the infant had discharg'd its fæces by the aperture made in the rectum, I blowed into this aperture, in order to discover to what degree these parts had been dilated by the retain'd matter, and accordingly found the dilatation to be very considerable. Having wash'd the whole with warm water, I cut the intestine longitudinally, in order to see distinctly wherein the imperforation consisted. I attempted, but in vain, to introduce probes of different bulks. The resistance was invincible, and I had even a good deal of difficulty to penetrate the center of it from within outwards, with a pretty small and sharp-pointed needle; the skin was more easily pierced. I left the needle thus introduced, and carried home with me this part, and whatever else could enable me to discover this fault of conformation, and the defect of the operations perform'd in order to remedy it. I observ'd in this case,

1. That the first aperture had been made between the coccyx, and the part where the anus ought to have been.

2. That the intestine had been entirely detach'd from the os sacrum.

3. That the black tumor was a species of hernia, form'd by the posterior part of the rectum, which, being push'd by the fæces during the infant's efforts to expel them, was with them introduced

duced into the incision, where it found less resistance than any where else ; and

4. That the whole portion of the intestine cover'd with the sphincter was entirely effac'd, without any vestige, disposition, or appearance of a cavity.

The first of these observations does not appear very essential, for we may possibly imagine that we have no occasion to fall into this error, when we are acquainted with anatomy. An anatomist may, however, fail in this operation, when he expects to find the parts such as he has seen them in dissecting a subject, the conformation of the parts of whose anus has been entirely natural, because the parts are very far from being always in that state. For this reason the greatest anatomists do not become skilful operators, till after having often dissected indisposed parts, and especially those affected with a bad conformation. Besides, an anatomist who has only dissected men, is not in a condition to operate equally safely on women, when they labour under disorders of the parts which distinguish their sex. In order to be sure of our procedure, we must have dissected women who have died both before and after delivery. In a word, those who have only dissected adults, may be deceiv'd in the diseases of new-born children.

The surgeon who sought for the anus of the infant who is the subject of this observation, sought for it near the coccyx, where he thought it was ; but he did not find it, because children, in this condition, have the part of the intestine which ought to form the anus, much farther from the coccyx, than adults, not only because the rectum, inflated by the fæces, repels the anus, and removes it from the coccyx, but also because, in the natural state, new-born children have the anus farther from the coccyx than adults ; or at least it appears to be so, because there is a great portion of the coccyx,

which, it not being as yet ossified, is soft, and yielding to the touch, which is the reason that the anus, or that which ought to be it, is farther from the bony part of the coccyx in infants than in adults.

The second observation I made on this operation was, that the rectum was detach'd from the os sacrum, because probably the surgeon had mov'd his finger from side to side between the rectum and os sacrum, with a view to penetrate into the cavity of the intestine, which cannot be done without a cutting instrument; for, by only using the finger for this purpose, we should separate the intestine from all the adjacent parts, rather than penetrate into its cavity, unless it was gangren'd or putrefied.

We perceive, by the third observation, that the black tumor appearing thro' the incision, ought to be look'd upon as an hernia; that instead of opening it, it ought to have been reduc'd, and that if there had been any resistance found (which was possible, because this portion of the intestine might have been strangulated by the smallness of the incision) it would have been necessary to enlarge the anterior angle of the wound; and the intestine being replaced, an aperture ought to have been made, as near as possible to the extremity which ought to form the anus; whereas having been open'd in the part where the tumor appeared, it was at least an inch higher than it ought to have been.

The fourth observation sufficiently evinces that infants, who have no external mark of an anus, and in whom nature has forgot that part of the rectum which ought to form it, are rarely recover'd. I do not assert that they all die, but it is certain that the fault of conformation cannot be repair'd. In a word, in all cases of this nature, the intentions of the surgeon may be reduc'd to two.

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The first is, to give vent to the fæces; which is possible. But the second, which does not depend on the surgeon, is to procure this vent or discharge through the sphincter, if there is any; and this ought to be done in such a manner, as that this muscle may afterwards resist, or permit the discharge of the excrements, without which, the infant, tho' cured, will necessarily have an involuntary discharge of his excrements; a disorder far more terrible than death could be at such an age.

Two indications
to be fulfilled.

On reflecting but a little on the state in which I have said the part of the intestine which ought to form the anus is, we shall easily perceive the difficulty, or rather the impossibility, of establishing this part in its natural state. For here every thing appears compact, and confounded under the form of an hard chord; which presents two insurmountable difficulties to the surgeon. The first of these is, that not being able to penetrate into the center of this chord, which is very small, he cannot form an anus of it; and the second is, that, tho' he could penetrate it exactly, yet, in order to dilate it, it would be necessary to put the sphincter in the state of dilatation it ought to be in. As these two things cannot be executed, so we cannot remedy a faulty conformation of this kind. However, in order to prevent the death of the infant, the surgeon ought to make an aperture in the place he thinks most proper to procure the evacuation of the retain'd matter, and this is all he can possibly do.

Some days ago there was brought to me an infant in the same case with the two already mentioned, that is to say, when born he had neither any aperture, nor mark in the part where the anus ought to be. An incision had been made in the skin and fat: as this incision was too near the

III. Observation
by the author on
an infant without
either aperture, or
mark of an anus.

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coccyx, the operator did not find what he wanted; but he was not rash enough to plunge his bistoury in a place with which he was unacquainted, neither had he the temerity to use his finger at random, as had been done in one of the cases before mention'd. He had told the parents that his incision would be sufficient, and that the retain'd matter would be discharg'd of itself. Accordingly they waited a day or two expecting this lucky accident; but perceiving that the infant was seiz'd with convulsions, and had its abdomen extremely tense and painful, they brought it to me. Notwithstanding the deplorable state in which I found it, I per-

Description of a
trocar, invented
by the author, to
make an aperture
in the anus.

form'd the operation. Instructed by the difficulties already mentioned, and those I have always found in similar cases, I thought it proper to take a method different from those I had before followed. But as I perform'd the operation with an instrument which every one does not as yet know, I shall here give a description of it, that the reader may the better comprehend the manner of using it. This instrument renders the operation more gentle, easy and safe, than any hitherto known. It is a trocar, shorter, but much larger, than those of the ordinary kind. The canula is only twelve or fifteen lines in length, its head about an inch in diameter, with a fissure from the aperture in the center to about a line and an half from the circumference. This fissure is sufficiently long and large to permit the passage of an imposthume lancet; the canula has also a fissure, equally wide on each side, from the head to about four lines from its end. The bodkin, when put into the canula, surpasses it in length by seven or eight lines. The three faces, and consequently the three angles, form a pyramid longer than that of
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the ordinary trocar, which renders it sharper, and capable of entering the flesh with greater ease.

Holding this instrument in my right hand, I searched for the species of chord formed by the sphincter, and easily discover'd it by putting the fore-finger of my left hand into the incision which had been made. With this finger I secured this chord, as much as I possibly could; then I plunged the trocar, and directed it towards the rectum, as well with the right hand as with the fore-finger of the left, which, in conducting it, secured that part which ought to form the anus, and presented it more or less to the point of the trocar, in order, if possible, to penetrate into its center. Having sufficiently plunged my trocar, I retracted the bodkin, immediately after which, wind, and a fluid matter were discharged thro' the canula. But, in order to procure an evacuation of the thicker matter, I enlarged the aperture with a pretty large lancet, which I passed into the fissure of the canula, which, as I have already said, is disposed in such a manner, that, without drawing it out, we may introduce a lancet, or bistory, into it, and make an incision as large as we please, without danger of wounding any part; because the point of the lancet, always keeping the center, is always concealed in the canula. I cannot say that I succeeded in this operation, since the infant died next day; only I am certain that, if there is a possibility of preserving life in such cases by operation, it can only be by performing it in the manner I have described. But it holds universally true, that this fault of conformation, is, of all others, most difficultly remedied by the surgeon.

Use of this instrument.

The case is not the same, when there is any mark or vestige of the anus, tho' close. This mark is, indeed, sometimes so slight, that it places the surgeon almost in the same uncertainty as the preceding cases.

cases. However, this mark, at least, indicates the part where the operator ought to attempt the discovery of the anus.

At other times the anus is extremely well formed, and, in this case, we are not only assured of the part we ought to open, but have also frequently little trouble to procure an evacuation of the retained matter, and form an anus, not only necessary for the present, but commodious for the future.

IV. Observation,
by the author, on
an anus closed on-
ly by a mem-
brane.

I was called to see an infant, who had not had a stool for two days after his birth. He appeared to have violent gripes, and his abdomen was very tense, inflated, and pain'd. They had attempted to inject clysters, but the liquor came out in proportion as the syringe was emptied, which was attributed to quite a different cause than that which I discovered. When I had inspected the infant, the first thing I did, in order to discover the species of the disorder, was to introduce an yielding and button-pointed probe. This enter'd about an inch with considerable ease, but I could not thrust it farther; I introduced my little finger in following the probe, and perceived a pretty slender membrane, which transversely closed up the cavity of the rectum above the sphincter muscle. If I could have introduced a bistory, guided by my finger, I would have cut this membrane; but the difficulty of introducing both into so narrow a place, with the danger of wounding these parts, made me prefer the pharyngotome, to which I had not then added the swallow-tail, as I have since done, in order to render it more commodious for the operation for which I contrived it. I slipp'd this instrument along my finger; then pushing its spring, in order to protrude the lancet it included, I cut enough of this membrane to procure admittance to my finger, with which I easily made the aperture large enough; because

because the membrane which blocked up the passage was slender, and made but small resistance. The infant went forthwith to stool, and continued to do so during the two months he lived. He did not die either of the disorder of the anus, or of the operation. I cannot say whether the sphincter performed its function, or whether it would have done so, provided he had liv'd. There is, however, some appearance that the anus would have performed its function, because every time I convey'd my finger into it, which I frequently did, I found almost the same yielding and resistance which are to be perceived by putting the finger into the anus of those who have not labour'd under this disorder, and on whom this operation has not been performed. I should have arrived at certainty in this point, by dissecting the body, if I had been apprized of his death.

I believe that, in this infant, all the local fault consisted in the membrane which I cut, and that the other parts, as far as the skin, were in their natural state. The case is not the same with those

Remark, of the author, on the different states of the intestine when closed up.

who want two or three finger-lengths of the extremity of the rectum: In these last, we neither find an hole in the anus, nor a canal into which we can introduce our finger. I do not know whether it is possible to find a canal, which has only the form of an intestine, without having its texture; but in all those I have seen, who wanted a considerable portion of the rectum, there was not only no external hole or canal, but I also never found, by dissection, any mark of a muscle in the part of the sphincter, nor any membrane between the skin, and that part of the intestine, where the retain'd matter was lodg'd. But of whatever kind this canal should happen to be, if I found one, whether organised or not, I would never hesitate to perform the operation I have described;

scribed; because, if this portion of the canal is not an intestine, it is at least a passage, which, being open in its bottom, will always permit the evacuation of the fæces, provided that with an instrument we luckily light on the end of the intestine which includes them. I shall give the remainder of these different faults of conformation, which are very numerous.

On the 20th of *March*, 1740, *M. Engerran* was called to visit an infant, born about four days before, who vomited up every thing he swallow'd, but discharged nothing by stool. From this, *M. Engerran* concluded that the rectum was closed up. He examined the infant, and found in the orifice of the anus a suppository of sope, which he extracted. He introduced into the entry of the anus a groov'd probe, which was stopp'd by a kind of hard body, that thrust it back when the infant made an effort to go to stool. *M. Engerran* knew, from this resistance, that the rectum was closed. He slip'd into the groove of the probe, a trocar; this open'd a passage for a great deal of the *meconium*, which was forthwith discharged†. *M. Engerran*, by means of a lancet fixed in a proper case, enlarged the aperture made by the trocar. The infant was greatly relieved by this operation, and continued to go to stool for about a month. However, new symptoms supervened, and induced death.

M. Engerran, on opening it, found, at the extremity of the rectum, a knot, like the navel of an adult. This knot had resisted the trocar and lancet, which had only penetrated the most slender part of the rectum above the knot; so that the operation was imperfect, because the aperture was not sufficient

† *M. Heister* says that, in 1714, he, in a similar case, used a trocar, but that his operation did not succeed. *German Ephemerides*, Cent. 3 & 4.

cient to give vent to the rest of the matter, which being retained, prov'd mortal to the infant.

From this M. *Engerran* understood that it would have been expedient to cut the knot, by means of a two-edged bistory, directed by the trocar above described. However, he makes several judicious remarks on this operation: He shews, for instance, that the bistory he proposes cannot be used, except when we are sure to find the knot to be cut; for it is easily conceived, that, when this knot exists, it may not be placed, with respect to the aperture, on the same side in which he found it; and if it was necessary to search for it before or behind, to the right or left of this aperture, we could not, without difficulty, light upon it; and the difficulty would be still greater to lay hold of it, so as to cut it. It would, therefore, be more sure to make an aperture sufficiently large to seek for it with the finger; and when once it is found, the finger would be more proper than the trocar for conducting the bistory. But the trocar we have described is very commodious, in such cases, to extend the aperture to a degree sufficient to admit the finger. M. *Engerran* does not indeed think that the success of the operation depends on cutting precisely the knot that terminates the rectum, because we cannot hope that there will be an anus, with its organic parts, form'd, rather by cutting precisely in the part of the knot, than at its side; thus, it seems, the most essential circumstance of this operation, is to make a sufficient aperture, such as is placed favourably to procure a total evacuation of the matter, and to preserve this aperture. For this reason our trocar is still the most proper instrument, for making this aperture, and for enlarging it sufficiently. We may judge, from the resistance of the knot, to the instruments used by M. *Engerran*, that it is often very difficult, as he observes, to pene-
trate

trate the extremity of the rectum, in the part where it is closed, and forms a solid body. It is, no doubt, for this reason, that *Riolanus*, in such cases, despairs of the success of the operation*. However, we find in *Hildanus*†, *Saviard*‡, and *Mangetus*§, examples of similar operations performed with success, even in cases where there was not externally the smallest appearance of an anus; but it must, nevertheless, be confessed that these examples are very rare.

* *Encbirid. anatom. Lib. II. Cap. 33.*
 ‡ Observ. 3. § Tome 2. pag. 500.

† Cent. I. Observ. 73.

